

HEALTH RISK AND PROTECTIVE BEHAVIORS OF SUICIDE ATTEMPTS IN
ADOLESCENTS WITH SUICIDE IDEATION

A DISSERTATION SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAI'I AT MĀNOA IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF

DOCTOR OF PHILOSOPHY

IN

PSYCHOLOGY

AUGUST 2017

By

Izumi Okado

Dissertation Committee:

Frank J. Floyd, Chairperson
Charlene Baker
Deborah Goebert
Kentaro Hayashi
Jeanelle Sugimoto-Matsuda

Keywords: suicide attempt, suicide prevention, adolescents, LGB, YRBS

ACKNOWLEDGEMENTS

I owe my appreciation to many people who have played a role in the completion of this dissertation study. First, I would like to thank Dr. Frank Floyd, dissertation committee chairperson, who reviewed many drafts and provided critical feedback throughout the course of this dissertation study. Second, I would like to thank the committee members, Dr. Charlene Baker, Dr. Deborah Goebert, Dr. Kentaro Hayashi, and Dr. Jeanelle Sugimoto-Matsuda, for their feedback, guidance, and support. I am especially grateful for Dr. Deborah Goebert, whose support and expertise on youth suicidal behaviors and youth suicide prevention were instrumental in data analyses and throughout the process of this dissertation study. I would also like to thank Dr. Jeanelle Sugimoto-Matsuda for her support and guidance on community-based suicide prevention efforts and implications on youth suicide prevention. Thank you to Dr. Hayashi for many consultations on structural equation modeling. Third, I would like to thank the Hawai'i Health Data Warehouse, Dr. Julia Chosy, and the Hawai'i State Departments of Education and Health, for the data sets used in this study.

Lastly, many thanks to my friends, cohorts, peers, and various associates for their support throughout graduate school. Special thanks to Eric Schank; I appreciate your support and encouragement throughout graduate school.

ABSTRACT

Suicidality among adolescents is a major public health concern. Although prior research has identified numerous risk factors for suicidal thoughts and behaviors, little is known about factors that uniquely predict suicide attempts. Additionally, although lesbian, gay, and bisexual (LGB) youth are at high risk for suicidality, suicidal behaviors in LGB youth are poorly understood. Based on the theories grounded in the ideation-to-action framework, the present study used structural equation modeling to examine health risk and protective behaviors associated with the escalation from suicidal ideation to suicide attempts among adolescents with suicide ideation generally, and LGB adolescents specifically. Data were drawn from the 2013 and 2015 Hawai'i High School Youth Risk Behavior Surveys. Overall, consistent with the hypothesis, disinhibition predicted the escalation to attempts in adolescents with suicide ideation. Further, higher academic performance was associated with lower suicide attempt risk in adolescents with and without suicidal ideation. Contrary to expectations, the model identified for the full sample was not supported for LGB adolescents. Among LGB youth with suicide ideation, self-harm and victimization potentiated suicide attempt risk. These findings point to the potential importance of suicide prevention efforts that incorporate specific risk and protective factors associated with the escalation from suicide ideation to attempts for adolescents generally and LGB youth specifically.

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CHAPTER 1. INTRODUCTION

Adolescent suicide is a serious public health problem. Suicide is the second leading cause of death among youths 10-24 years old, and approximately 4,600 young people die each year from suicide (CDC, 2016a). Although significant advances have occurred in understanding adolescent suicide in the past few decades, numerous knowledge gaps remain. Notably, relatively little is understood about predictors of future attempts and how people progress from experiencing suicidal ideation to actually attempting suicide (Klonsky, May, & Saffer, 2016; Prinstein et al., 2008; Nock et al., 2008). Considerable research has focused on identifying risk factors for adolescent suicide; however, recent research indicates that these risk factors predict the development of suicidal ideation only (Klonsky et al., 2016). Factors associated with the escalation from suicidal thoughts to attempts remain largely unknown (Klonsky et al., 2016; Nock et al., 2008).

Another gap in our knowledge about suicide concerns the experiences of lesbian, gay, and bisexual (LGB) youth, who are at disproportionately higher risk for suicide ideation and suicide attempts compared to heterosexual peers, but for whom there is little information about the predictors or escalation of suicidal thoughts and behaviors (e.g., Eisenberg & Resnick, 2006; Hatzenbuehler, 2011; Silenzio, Pena, Duberstein, Cerel, & Knox, 2007; St. John, 2015). Thus, it is important to gain a better understanding of suicidality among LGB youth.

The present study aimed to address these two knowledge gaps and examined potential health risk and protective behaviors associated with the transition from suicide ideation to attempts in a representative sample of high school students and a subgroup of

youth identifying as LGB. Filling these two knowledge gaps may suggest promising targets for suicide prevention as well as inform risk assessment and intervention.

Adolescent Suicide Indicators

The Centers for Disease Control and Prevention (CDC) defines suicide as “death caused by self-directed injurious behavior with any intent to die as a result of the behavior” (CDC, 2016b). More generally, the CDC classifies self-directed violence into two categories: non-suicidal self-directed violence and suicidal self-directed violence (Crosby, Ortega, & Melanson, 2011). Suicidal self-directed violence includes 1) *suicidal ideation*, which refers to thoughts of engaging in behavior intended to end one’s life and/or formulation of a specific plan/method through in which one intends to die, 2) *suicide attempt*, which refers to self-injurious behavior with an intention to die as a result of the behavior, and 3) *suicide* (Crosby et al., 2011; CDC, 2016b). It is important to note that suicide attempts are conceptualized as distinct from nonsuicidal self-injury (NSSI), in which individuals engage in self-harming behavior (e.g., cutting, burning, head-banging) to seek relief from emotional pain without an intention to die (e.g., Asarnow & Miranda, 2014; Nock et al., 2008). Thus, according to the CDC definition, not all forms of self-directed violence are suicide-related.

Adolescence (ages 12-17 years) is a critical period for onset of suicidal ideation, and research has documented the dramatic increase of suicide ideation and attempts during this developmental period (Nock et al., 2008). According to the most recent Youth Risk Behavior Surveillance Survey (YRBSS), 17.7% of high school students seriously considered attempting suicide, 14.6% made a suicide plan, and 8.6% reported making a suicide attempt during the past 12 months (CDC, 2016a). Moreover,

approximately 60% of adolescents who experience suicidal ideation eventually attempt suicide, and the majority of adolescents (86.1%) who escalate from ideation to attempt do so within the first year of onset of suicide ideation (Nock et al., 2013). Thus, it is important to further understand factors associated with the transition from suicide ideation to attempts in adolescents, particularly given the speed of escalation to attempts following the onset of suicide ideation.

Risk and protective factors for suicide ideation and attempts in adolescents have been well-documented. Research shows that the strongest predictor of suicide attempts is a previous attempt (e.g., Beghi & Rosenbaum, 2010; Borowsky, Ireland, & Resnick, 2001; Lewinsohn, Rohde, & Seely, 1994; World Health Organization, 2014). According to a longitudinal study, up to 70% of adolescent attempters repeat suicide attempts within the year of a previous attempt (Gehin, Kabuth, Pichene, & Vidailhet, 2009). In addition to a prior attempt, psychopathology is another frequently cited risk factor for adolescent suicide. According to Nock and colleagues (2013), nearly 90% of adolescents with suicide ideation meet criteria for at least one *DSM-IV* disorder, with the majority of youth meeting criteria for depression or anxiety disorders. Substance use (alcohol and illicit drug use) and disruptive behavior disorders are also associated with the elevated odds of suicide ideation and suicide attempts (Nock et al., 2013). Finally, psychosocial factors such as stressful life events, experiencing interpersonal violence, and being the target of aggression have been identified as correlates of suicidal thoughts and attempts (e.g., Brent et al., 1993; Evans, Hawton, & Rodham, 2004; Garrison, McKeown, Valois, & Vincent, 1993; Gould, Greenberg, Velting, & Shaffer, 2003; Shaffer, 1988). As will be discussed below, these risk factors generally predict the development of suicidal ideation

only, and less is known about factors that uniquely predict the escalation from ideation to attempts (e.g., Klonsky et al., 2016; Prinstein et al., 2008).

Suicidality among LGB Youth

Research indicates that adolescents identifying themselves as lesbian, gay, or bisexual (LGB) are at substantially elevated risk for suicide-related issues (e.g., Haas et al., 2010; Ploderl et al., 2013; Russell & Fish, 2016). The 2015 YRBSS results indicate that 42.8% of youth who identified as LGBQ seriously considered suicide and 29.4% had attempted suicide in the past twelve months, whereas 14.8% and 6.4% of heterosexual peers reported suicide ideation and attempts, respectively (CDC, 2016a). Other studies have also found disproportionately high rates of suicidal ideation and suicide attempts among LGB youth (e.g., D’Augelli et al., 2005; D’Augelli, Hershberger, & Pilkington, 2001; Eisenberg & Resnick, 2006; Hatzenbuehler, 2011; Marshal et al., 2011; Safren & Heimberg, 1999).

Although numerous risk and protective factors for suicide attempts have been identified for the general adolescent population, it is unclear whether such factors differ between LGB and heterosexual youth. On the one hand, some theoretical and empirical work suggests that many correlates of suicide-related behaviors are associated with suicidal adolescents generally. For example, hopelessness, depression, and low social support are major components of suicidal thoughts and behaviors that cut across many theoretical perspectives. Empirical evidence also indicates that such risk factors for suicidality are common to both LGB and heterosexual youth (Mustanski & Liu, 2012; Whitaker, Shapiro, & Shields, 2016). Additionally, connectedness, adult support, and school safety are known protective factors against suicidal behaviors in both LGB and

non-LGB youth (e.g., Eisenberg & Resnick, 2006; Kaminski et al., 2010; Whitlock, Wyman, & Moore, 2014).

However, other existing findings suggest that some risk and protective factors may exert a stronger influence on suicide-related problems in LGB youth compared to heterosexual youth. For instance, studies that specifically compared LGB and heterosexual youth have found that depression, alcohol abuse, victimization, poor social support, and self-harm are associated with elevated odds of suicide attempts in LGB youth but not heterosexual youth (Almeida et al., 2009; Burton, Mashal, Chisolm, Sucato, & Friedman, 2013; Eisenberg & Resnick, 2006; Hatzenbuehler, 2011; Russell & Joyner, 2001). There is also preliminary evidence that school-related factors such as feeling safe at school and teacher/adult support have stronger protective effects against suicidal behaviors in LGB adolescents than other youth (St. John, 2015; Whitaker, Shapiro, & Shields, 2016).

Additionally, according to Meyer's minority stress model (2003), stressors associated with LGB sexual orientation put these individuals at higher risk for suicidal thoughts and behaviors. Briefly, this model describes distal and proximal stress processes that impact LGB individuals (Meyer, 2003). Stressors that are thought to exert distal influence on mental health in LGB individuals include prejudice, discrimination, and stigma. Further, proximal or individual-level stress processes include negative self-perceptions and appraisals such as expectations of rejection and the perception of the self as a stigmatized minority (Meyer, 2003). Regarding suicidal behaviors, the minority stress hypothesis suggests that LGB individuals are vulnerable to suicidal thoughts and suicide attempts due to excess in distal and proximal stressors related to one's sexual

orientation (Meyer, 2003). Thus, it is possible that there may be unique or additional risk factors that potentiate suicide attempt risk among LGB adolescents compared to the general adolescent population.

Although recent advances in research have increased knowledge on health issues among LGB youth, there are some limitations in the literature. Notably, there is a paucity of studies on suicidality in LGB youth. Further, in some prior research, study samples were comprised of LGB youth only with no heterosexual control groups; thus, it is unknown whether the characteristics of suicide ideation or attempts found in these studies can be attributed to the youth's sexual orientation (e.g., Anhalt & Morris, 1998; Savin-Williams, 1994). Additionally, most research on suicide attempts in LGB youth has used convenience samples, such as those drawn from LGB community-based support groups and projects. The generalizability of such findings to youth who do not seek community/other support groups or those who do not disclose their sexual orientation is unknown (Anhalt & Morris, 1998; McDaniel, Purcell, & D'Augelli, 2001; Russell & Joyner, 2001). Lastly, very little is known about racial and ethnic differences in suicidality among LGB youth (Russell & Fish, 2016). Limited research indicates that among LGB youth, African American, Native American, Pacific Islander, Latino, and multi-racial youth are at elevated risk for suicide attempts (Bostwick et al., 2014; Garofalo et al., 1999; O'Donnell, Meyer, & Schwartz, 2011; Remafedi, 2002). However, other studies did not corroborate these findings (Consalacio, Russell, & Sue, 2004; Mustanski, Garofalo, & Emerson, 2010). Taken together, further research on suicidality in LGB youth using a community-based sample could provide a greater understanding of

suicidality and illuminate potential risk and protective factors that might contribute to suicidal ideation and attempts in these youth.

Theoretical Models of Suicidal Ideation to Action

Many theoretical models of suicidal ideation and attempts describe the etiology and course of self-directed violence along a continuum of lethality, with suicide as the final endpoint (O'Carroll et al., 1996). Such models suggest that a single driving motivation or a specific domain of risk explains the development of suicidal ideation and attempts (O'Connor, 2011). For example, one of the seminal researchers in suicide research, Shneidman (1993) proposed that the consciousness of unbearable psychological pain, or psychache, is the primary motivator of suicide. Further, Shneidman (1993) posited that suicide occurs when an individual's threshold for tolerating psychic pain is surpassed, and that suicide in itself is an act of moving away from the unendurable pain rather than a movement toward death. Other early researchers noted that the prevalent motives for nonfatal suicide attempts are to obtain respite from psychic pain and to escape from an aversive emotional state (e.g., Bancroft, Skrimshire, & Simkins, 1976; Evans, Hawton, Rodham, Psychol, & Deeks, 2005; Parker, 1981).

Within the clinical literature, Beck (1986) posited that among those who are depressed, levels of hopelessness predict the severity of suicide intention. Citing empirical findings, Beck (1986) speculated that the desire to terminate one's life is more likely to escalate to an attempt when suicide is viewed as a way to escape from an insoluble problem (Beck, 1986; Beck, Kovacs, & Weissman, 1979). Hopelessness develops when one harbors the pessimistic view that a problem is insoluble, and hopelessness and negative appraisal may lead to the development of the desire to end

one's life (Beck, 1986). Accordingly, many researchers posited that hopelessness is a key predictor of suicide (e.g., Abramson, Metalsky, & Alloy, 1989; Beck, 1986; Beck, Brown, & Steer, 1989; Beck, Brown, Steer, Dahlsgaard, & Grisham, 1999). Consistent with this notion, more recent research on adolescent suicidality indicates that hope distinguishes between youth who have suicide ideation only and those who act on their suicidal thoughts (Gould et al., 2003). In a study on adolescent suicide attempters, hopelessness and the presence of suicide ideation differentiated suicide attempters from other at-risk youth with psychiatric disorders (Swedo et al., 1991). Conversely, among suicidal adolescents, feelings of hopefulness are thought to bolster coping beliefs and thus impede the escalation to attempts (Range & Penton, 1994).

More recent theories have integrated social and cognitive models to explain causal processes of suicide. Most notably, in the escape theory of suicide, Baumeister (1990) proposed a six-step causal chain that leads to suicide: 1) the occurrence of a severe negative experience such as major setbacks or chronic poverty, and/or recent problems such as unemployment or a relationship break-up; 2) disappointment associated with the severe experience is internalized and attributed to the self; 3) the development of an aversive state of high self-awareness as a result of comparing the self with relevant standards; 4) increased negative affect; 5) an attempt to try to escape this unhappy state by numbing cognition/emotion; and 6) impaired cognitive functioning as reflected by cognitive rigidity, disinhibition, and/or irrational beliefs leads to increased willingness to attempt suicide. According to Baumeister (1990), suicide emerges as an escalation of the desire to escape from aversive self-awareness and current life problems.

Ideation-to-Action Framework

Klonsky and May (2014) proposed an alternative theoretical framework termed the ideation-to-action framework. A departure from earlier models that conceptualized suicide-related thoughts and actions as operating along a continuum, the ideation-to-action framework stipulates that the development of suicidal ideation and the progression from thoughts of suicide to acting on suicidal thoughts are distinct phenomena and involve different predictors and explanations (Klonsky & May, 2014). Within this framework, three recent theories describe distinct processes underlying the development of suicidal ideation and the escalation from ideation to attempts.

The first theory grounded in the ideation-to-action framework is the interpersonal-psychological theory of suicidal behavior proposed by Joiner (2005). This theory stipulates that the desire for suicide and the capability to act on suicidal thoughts are distinct and involve different predictors (Joiner, 2005; Van Orden, Merrill, & Joiner, 2005; Van Orden, Witte, Cukrowicz, Braithwaite, Selby, & Joiner, 2010). According to this theory, individuals develop thoughts of suicide when two conditions are present: 1) perceived burdensomeness, which is the perception that one's existence is a burden to family, friends, and/or society; and 2) thwarted belongingness, which refers to an unmet need to belong (Baumeister & Leary, 1995; Joiner et al., 2009; You, Van Orden, & Conner, 2011). Van Orden and colleagues (2010) further described thwarted belongingness as a psychologically painful mental state characterized by indices associated with suicide such as social isolation, low social support, and social withdrawal (Durkheim, 1951; Baumeister & Leary, 1995). Although perceptions of burdensomeness and thwarted belongingness are theorized as precursors of suicidal ideation, these two factors alone do not predict the capability to attempt suicide (Joiner et al., 2009). Further,

it is important to note that although this theory has been conceptualized to be applicable across the lifespan and has empirical support for adults, some constructs such as perceived burdensomeness might not be equivalent between adults and adolescents (see Stewart, Eaddy, Horton, Hughes, & Kennard, 2015, for a review). Accordingly, a recent review suggests that in research focused on suicidality in adolescents, items that measure perceived burdensomeness might need to be modified or supplemented in order to capture these constructs in the context of adolescence (Stewart et al., 2015).

According to Joiner (2005), few people want to die by suicide, but even fewer can take their own lives. Given that one's body is generally not designed to enact its own demise, suicide entails fight with self-preservation motives that are so powerful that few can overcome by force of will (Joiner et al., 2009). Accordingly, only those who have developed the ability to tolerate the potential shame, physical pain, and fear associated with lethal self-injury possess the capability to move on to take their own lives (Joiner et al., 2009). In the context of this theory, one way to gain the capability to die by suicide is habituation to the fear and pain involved with self-harm (Van Orden et al., 2005). With repeated practice or experience with suicidal methods such as cutting one's wrist and tying a noose, the fear and pain associated with death are thought to diminish, strengthening one's capability to attempt suicide (Van Orden et al., 2005). Indeed, empirical evidence indicates that a prior suicide attempt is the most reliable predictor of future attempts (e.g., Borowsky et al., 2001; Van Orden et al., 2008). Another way to acquire the capability to die by suicide is through repeated exposure to events and behaviors associated with pain but not necessarily related to self-injury (Van Orden et al., 2005). For instance, direct or vicarious experience with violent or physically painful

events and behaviors such as combat exposure or physical abuse is considered a potential source for habituation to the pain and fear associated with death (Joint et al., 2009). Moreover, impulsivity is conceptualized as an indirect risk factor for suicide (Van Orden et al., 2005). Impulsive individuals are more likely to experience painful and provocative events such as being injured in a car accident, and such experiences are considered to diminish the pain and fear associated with death (Van Orden et al., 2005). Thus, the painful and provocative experiences that result from impulsivity are thought to strengthen the capability to attempt suicide (Van Orden et al., 2005). That said, findings from limited research on the association between impulsivity and suicidality in adolescents are mixed, and further studies are needed to clarify whether impulsivity plays a more direct role in the escalation to suicide attempts among suicidal adolescents (Stewart et al., 2015). In summary, the interpersonal-psychological theory of suicide describes the development of suicidal ideation and the capability to die by suicide as distinct phenomena, and the presence of perceived burdensomeness, low belonging, and the acquired capability is necessary for one to enact lethal self-injury (Joiner, 2005; Joiner et al., 2009).

The second theory positioned within the ideation-to-action framework is the Integrated Motivational-Volitional Model of Suicidal Behaviour (IMV; O'Connor, 2011). Extending Joiner's (2005) theory, the IMV model integrated cognitive and interpersonal-psychological theories and mapped the relationship between background factors that confer vulnerability to suicidal ideation, the development of suicide ideation, and the progression to attempts. This model posits three phases: pre-motivational, motivational, and volitional. In the first "pre-motivational" phase, the factors that determine

vulnerability to suicide ideation are explained based on the diathesis-stress model (e.g., Schotte & Clum, 1987). Such factors include diatheses such as a biological predisposition to psychopathology and cognitive rigidity, stress as a result of negative life events, and environmental influences such as poverty. The complex interplay among these factors is theorized to contribute to vulnerability to suicide ideation (O'Connor, 2011). The second phase, termed the motivational phase, explains the formation of suicidal ideation. Feelings of entrapment in which suicide is seen as the salient solution to life circumstances are triggered by feelings of defeat and humiliation (O'Connor, 2011). Such feelings are usually preceded by negative life events and other factors associated with the pre-motivational phase (O'Connor, 2011). When feelings of entrapment are accompanied by other risk factors such as thwarted belonging, low social support, and a lack of positive expectations for the future, the combination of such feelings and risk factors leads to suicidal thoughts (Dhingra, Boduszek, & O'Connor, 2015; O'Connor, 2011). In the third "volitional" phase, the transition from suicidal thoughts to attempts is conceptualized to occur when additional risk factors called the *volitional moderators* are present (O'Connor, 2011). Examples of such factors include impulsivity, having access to lethal means, and habituation to self-injury as described in the interpersonal-psychological theory of suicide (Joiner, 2005; O'Connor, 2011). This model has been tested in adults, and there is preliminary empirical support that the model differentially predicts the development of suicidal ideation and the progression from ideation to attempts (Dhingra, Boduszek, & O'Connor, 2015).

Lastly, the most recent theory grounded in the ideation-to-action framework is the Three-Step Theory (3ST) of suicide proposed by Klonsky and May (2015). In this

theory, three steps are involved in the development of suicidal ideation and the progression from ideation to attempts: 1) pain and hopelessness lead to the development of suicidal ideation, 2) pain exceeds connectedness, and 3) the culmination of dispositional, acquired, and practical factors leads to a capacity to attempt suicide. Step 1 stipulates that the presence of both pain and hopelessness is necessary for the development of suicidal ideation (Klonsky & May, 2015). In Step 2, connectedness and pain predict whether the individual develops an active desire to end his/her life. In this theory developed for adults with suicidal ideation, connectedness refers to connections to other people as well as one's attachment to a job, a role such as being a parent, an interest such as sports, or a sense of purpose or meaning that keeps one invested in living. Based on the literature, connectedness in adolescents may refer to connections to adult support in and outside of school, participation in sports, and academic achievement. In Step 3, once the individual has developed a suicidal desire, the following three factors contribute to a suicide capacity: 1) dispositional factors which are driven largely by a biological predisposition such as low pain sensitivity and low fear of death, 2) habituation to painful experiences as described by Joiner (2005), and 3) practical factors such as access to lethal means and knowledge of suicide methods. In summary, a key difference between the three-step and other models is that connectedness is thought to foster a desire to live even among those with both pain and hopelessness, and an individual develops an active desire to end his/her life only when the pain exceeds connectedness (Klonsky & May, 2015). The 3ST theory (Klonsky & May, 2015) is the most recent model within the ideation-to-action framework, and empirical research is needed to examine the applicability of this theory to suicidal adolescents.

Present Study

Based on the ideation-to-action framework that suggests the delineation between factors associated with the development of suicidal ideation and the escalation from ideation to attempts, the present study examined risk and protective health behaviors that are theorized to differentially predict suicidal ideation and the transition from ideation to attempt in adolescents generally, and specifically among LGB youth. To that end, health risk behaviors associated with depression and stress such as hopelessness and victimization were hypothesized to correlate with suicidal ideation, whereas substance use, disinhibition, and behaviors that contribute to habituation to pain such as violent behavior and self-harm were conceptualized as predictors of the escalation from suicide ideation to attempts. In addition, indicators of connectedness and perceived school safety were examined as potential protective factors against the escalation of suicidal ideation to attempts. As will be discussed below, empirical work provides much support for various components of the theory and helped to operationalize the constructs for the purposes of this study.

Suicidal Ideation

Empirical evidence and theoretical formulations point to depression and psychic pain as major components of suicidal ideation (e.g., Baumeister, 1990; Shneidman, 1993; Schotte & Clum, 1987). The associations between suicidal ideation and symptoms of depression such as sadness, hopelessness, and lack of positive future thinking are well-established (e.g., Beck, 1986; Kessler, Borges, & Walters, 1999; O'Connor, O'Connor, O'Connor, Smallwood, & Miles, 2004; Shahar, Bareket, Rudd & Joiner, 2006). Specifically, research indicates that hopelessness is a major predictor of suicidal ideation

(e.g., Beck, Steer, Beck, & Newman, 1993; Kazdin, French, Unis, Esveltd-Dawson, & Sherick, 1983; Minkoff, Bergman, Beck, & Beck, 1973), and many theories including those positioned within the ideation-to-action framework have linked hopelessness and suicidal ideation in their models (e.g., Beck, 1983; Klonsky & May, 2015; O'Connor, 2011). Although it is possible that depression is also associated with the escalation from ideation to attempts, the results from prior research indicate that depression predicts the development of suicidal ideation but not the transition to attempts (Klonsky et al., 2016; Nock et al., 2008). Thus, the present study examined depression as a risk factor for suicidal ideation.

In addition, adverse life events such as physical/sexual assault and bullying are strongly linked to the development of suicidal ideation (e.g., van Geel, Vedder, & Tanilon, 2014). The psychosocial sequelae of physical/sexual abuse and bullying are well-documented, and such negative life experiences are associated with a four- to twelve-fold increased risk of severe impairments including depressive symptomatology, substance abuse, and suicide ideation (e.g., Klomek, Marrocco, Kleinman, Schonfeld, & Gould, 2007; Felitti et al., 1998; Silverman, Reinherz, & Giaconia, 1996). Moreover, adolescents with victimization experiences often report social withdrawal and feelings of alienation from others (e.g., Pelcovitz et al., 1997), both of which are components of suicidal ideation in various theories of suicide (e.g., Baumeister, 1990; Durkheim, 1951; Klonsky & May, 2015; O'Connor, 2011). Additionally, research has shown that victimization frequently contributes to the development of hopelessness, which, in turn, influences the development of suicidal ideation (e.g., Beck et al., 1979; Bonanno & Hymel, 2010). Thus, the empirical evidence and theoretical models suggest that

victimization experiences trigger the sequence of events/feelings/perceptions that leads to suicidal ideation.

Transition from Ideation to Attempt

Consistent with Joiner's theory (2005), self-harm behavior was theorized to predict the escalation from suicide ideation to attempt. Empirically, deliberate self-harm has been shown to confer substantial risk for suicide attempts in adolescents (Andover, Morris, Wren, & Bruzzese, 2012; Asarnow & Miranda, 2014; Wilkinson & Goodyer, 2011). Moreover, according to the interpersonal-psychological theory (Joiner, 2005), self-harm is one way for individuals to acquire the capability to die by suicide (Van Orden et al., 2005). Thus, suicidal adolescents who engage in self-harm behavior may be more likely to act on suicidal thoughts than those who do not engage in such behavior.

Similarly, violent behavior such as engaging in physical fights may contribute to the escalation to attempts in adolescents with suicide ideation. Research has consistently demonstrated the link between suicide attempts and aggression and violence perpetration (e.g., Borowsky et al., 2001; Conner, Duberstein, Conwell, Seidlitz, & Caine, 2001; Dumais et al., 2005; Garrison, McKeown, Valois, & Vincent, 1993; Simon et al., 2007). There is also some evidence that aggression distinguishes suicide attempters from non-attempters (Mann, Waternaux, Haas, & Malone, 1999). Moreover, in the context of Joiner's theory, violent behavior is viewed as one potential way to acquire the capacity to act on suicidal thoughts (Joiner, 2005; Joiner et al., 2009). Therefore, it is logical to view violent behaviors as potential risk factors for the escalation from suicidal ideation to attempts.

Higher levels of behavioral disinhibition may also influence the transition from suicidal ideation to attempts in adolescents. Although definitions of disinhibition vary, in this study, disinhibition was conceptualized as broad deficits in behavioral control (Gorenstein & Newman, 1980). Such deficits are characterized by behaviors such as acting without thinking, failing to inhibit an initiated response, and disregarding risks and consequences of behaviors (Janis & Nock, 2009). Disinhibition is thought to confer vulnerability to various externalizing behaviors including impulsivity and the tendency to seek intense sensations and experiences to novel stimuli or potential rewards (Ortin, Lake, Kleinman, & Gould, 2012; Young et al., 2009). Accordingly, disinhibited youth may be more likely to engage in risky behaviors such as reckless driving, drug use, have multiple sex partners, and suicidal behaviors. There is some empirical evidence that suggests that behavioral disinhibition is associated with suicide attempt risk. For example, a study by Mann and colleagues (1999) that examined risk factors for suicide attempts found that lifetime aggression and impulsivity characterized attempters. Further, Witte and colleagues (2008) reported that high levels of impulsivity described adolescents who planned and attempted suicide, whereas attempters without plans or those with ideation only showed low levels of impulsivity. Moreover, the presence of psychiatric diagnoses associated with disinhibition and poor impulse control such as conduct disorder and substance abuse has been shown to predict the escalation to attempts in suicidal adolescents (Nock et al., 2010). Thus, it is possible that suicidal adolescents with higher levels of behavioral disinhibition may be more likely to attempt suicide than those with low disinhibition.

Relatedly, the association between substance use and suicide attempts has been

well-documented (e.g., Garrison et al., 1993; Windle & Windle, 1997). For example, in their review on adolescent substance use and suicidality, Esposito-Smythers and Spirito (2004) reported that adolescents who use illicit drugs such as cocaine, heroine, and hallucinogens are significantly more likely to attempt suicide than those who do not engage in such substance use. Furthermore, according to a study based on the nationally representative sample of adolescents, illicit substance use, in particular hard substances, is associated with suicide attempts (Wong, Zhou, Goebert, & Hishinuma, 2013). One possible explanation for substance use driving the move toward suicide attempts in those with suicidal thoughts is disinhibition. Decreased inhibition caused by substance use may remove psychological and other inhibiting barriers to self-directed violence including suicide attempts (Skog, 1991). In fact, it has been suggested that decreased inhibition associated with substance use may lead to an impulsive decision to attempt suicide (Gould et al., 2003). Another possible explanation may be that consistent with Baumeister's theory (1990), heightened negative affect and numbed cognition that result from substance use may amplify the desire to escape from unbearable stress or aversive self-awareness among those with suicidal ideation, triggering the causal chain leading to suicide attempts.

Conversely, connectedness may play a critical role in impeding the escalation from suicidal ideation to attempts (Klonsky & May, 2015). According to the Three-Step Theory (Klonsky & May, 2015), connectedness to others or a sense of purpose/meaning serves to protect against the transition from ideation to attempts. In the context of adolescents, indicators of such connectedness may include adult support in and outside of school, friends/peers, school/education, and extracurricular activities such as sports.

Connectedness may protect against suicidal thoughts and behaviors by enhancing well-being through emotional and instrumental support from social connections (Whitlock et al., 2014). Social connections such as adults in and outside of school are thought to foster a perceived sense of belonging, which, in turn, may increase positive emotions and positive views of self, thereby buffering against suicidal thoughts and behaviors (Whitlock et al., 2014). Further, given that school and extracurricular activities are primary contexts for social development and learning during adolescence, an interest such as sports or connections to school/education might be particularly salient protective factors against suicide attempts in adolescents. Although studies that focused on the role of connectedness on suicidal progression are limited, there is preliminary evidence that indicates that adult social support, academic achievement, and participation in sports serve to protect against the escalation to suicide attempts (Borowky et al., 2001; Donald, Dower, Correa-Velez, & Jones, 2006; Evans et al., 2004).

Further, limited studies suggest that the protective effects of connectedness against the escalation to attempts may be particularly important for LGB youth. Studies that compared suicide protective factors between LGB and heterosexual youth found that the perceived availability of adult support in school is associated with lower risk for suicide attempts (e.g., Goodenow, Szalacha, & Westheimer, 2006; St. John, 2015). Relatedly, safe and supportive school environment has been suggested as an important protective factor against victimization and suicidality among LGB youth (Goodenow et al., 2006). Thus, it is possible that connectedness is particularly important for LGB youth who are at elevated risk for suicidality.

In summary, in order to advance knowledge on adolescent suicide, it is critical to

identify the factors associated with the escalation from suicidal thoughts to attempts, as such factors might illuminate potential targets of suicide prevention and intervention. The present study examined health behaviors that may serve as risk and protective factors for suicidal ideation and the transition from ideation to attempts in a representative sample of high school students in Hawai‘i. Specifically;

1. First, the study examined suicide ideation, attempts, and the pathway between these two behaviors. Using structural equation modeling, the study investigated: a) the effects of depression and victimization on suicidal ideation, and b) the impact of self-harm, violence, disinhibition, substance use, and connectedness on the escalation to suicide attempts among youth with suicide ideation.
2. Second, in order to further understand suicidality among LGB youth, the study examined the structural equation model from the first study aim within this subgroup of youth.
3. Third, the study compared the effects of health risk and protective behaviors on suicidal ideation and the escalation to attempts between LGB and heterosexual youth using multi-group structural equation modeling.

Chapter 2. Method

The Hawai‘i Youth Risk Behavior Survey

The present study used data from the 2013 and 2015 Hawai‘i Youth Risk Behavior Survey (HYRBS; Hawai‘i Health Data Warehouse, 2013; 2015) for high school students. The HYRBS is a cross-sectional survey designed to assess the prevalence of health risk behaviors among a representative sample of adolescents attending Hawai‘i public schools (Saka, Fagaragan, Lindstrom, & Afaga, 2016). This survey is a part of the Youth Risk Behavior Surveillance System (YRBSS) developed by the CDC in 1991 to monitor six priority health risk behaviors that contribute to the leading causes of death and disability among U.S. adolescents. It is administered in the spring of odd-numbered years by the Hawai‘i State Departments of Education and Health in collaboration with the CDC (Saka et al., 2016). The six categories of priority health-risk behaviors monitored by the YRBSS/HYRBS include behaviors that contribute to injuries/violence, tobacco use, alcohol/other drug use, high-risk sexual behaviors, unhealthy dietary behaviors, and physical inactivity (CDC, 2016a).

Survey design and procedures are described in greater detail elsewhere (Brener et al., 2013; Saka et al., 2016). Briefly, the survey was conducted using a two-stage stratified random sampling procedure. In the first sampling stage, public high schools were randomly selected based on the probability proportional to the size of school enrollment (Kann et al., 2016). In the second sampling stage, students attending randomly sampled classes in participating schools were selected to complete the survey (Kann et al., 2016). Participation was voluntary, and school-level personnel proctored the self-administered questionnaire survey (Saka et al., 2016). The 2015 survey was the

first HYRBS to use an opt-out option, whereby adolescents were eligible to give assent for study unless their parents returned the signed form indicating that they did not wish their child to participate (Saka et al., 2016). According to the report by Saka and colleagues (2016), the overall response rate (calculated by multiplying school response and student response rates) for the 2015 HYRBS was 78%, with 33 high schools from Honolulu (15), Hawai‘i (8), Kaua‘i (3), and Maui (7) counties participating in the survey (Saka et al., 2016). For the 2013 HYRBS survey, the overall response rate was 60%, and 34 high schools from Honolulu (15), Hawai‘i (9), Kaua‘i (3), and Maui (7) counties participated in the survey (Saka, Takeuchi, Fagaragan, & Afaga, 2014). Data from the 2013 and 2015 Hawai‘i YRBS are statistically weighted by the CDC to reflect the likelihood of sampling of each student and account for nonresponse, which allows for valid statewide comparisons across years (Saka et al., 2016).

The 2015 Hawai‘i YRBS consisted of 99 multiple-choice questions including 65 CDC-developed questions (core items) and 34 Hawai‘i-specific questions that covered health-related topics of local interest such as mentor-like relationships and medical checkups (Saka et al., 2016). There were 62 CDC-developed questions and 37 Hawai‘i-specific questions in the 2013 Hawai‘i YRBS (Saka et al., 2014). Background and methodology of the YRBSS are described in detail elsewhere (Brener et al., 2013). Briefly, in the development of the YRBSS, the CDC established a steering committee consisting of members appointed by the federal agencies that monitor the incidence and prevalence of risk behaviors associated with morbidity and mortality (Brener et al., 2013). The steering committee and the CDC jointly established an expert panel for each area of priority behaviors, and the panel recommended a limited number of questions to

measure the prevalence of those behaviors (Brener et al., 2013). The items were then reviewed by representatives from the education agency of each state and pilot-tested by survey research specialists from the CDC's National Center for Health Statistics (Brener et al., 2013). The YRBSS was first administered in 1991 by 26 states and 11 large urban school districts (Brener et al., 2013). Subsequently, the YRBSS has been conducted in odd-numbered years at the national, state, territorial, and large urban school district levels (Brener et al., 2013).

The YRBSS has no formal subscales or procedures for constructing subscales. Thus, subscales for the present study were initially created to assess health risk and protective behaviors according to content and based on item groupings used in prior studies. Final subscales were derived through internal consistency and exploratory factor analyses of the study variables. If any subscale demonstrated weak internal consistency in preliminary analysis, appropriate adjustments to the items in the subscales were made including removal of items or any addition of relevant items.

Participants

The sample ($N = 8,113$) was 54.0% female and racially/ethnically diverse, with 25.4% of youth self-identifying as Native Hawaiian/Part Hawaiian, 18.7% as Filipino, 17.2% as Hispanic/Latino, 16.2% as more than one race (multi-racial), 8.6% as White, 4.4% as Other Pacific Islander, 4.4% as Japanese, 4.2% as Other Asian, 0.7% as Black/African American, and 0.2% as American Indian/Alaska Native. The sample was relatively evenly split across grade levels, with 25.9%, 26.4%, 24.3%, and 23.4% of adolescents in 9th, 10th, 11th, and 12th grades, respectively.

With respect to sexual orientation, based on the Institutes of Medicine definitions, the present study classified youth in three main categories of sexual orientation: 1) gay or lesbian, whose attractions and behaviors focus exclusively or mainly on members of the same sex, 2) bisexual, whose sexual or romantic behaviors are directed at members of both sexes to a significant degree, and 3) heterosexual, whose sexual or romantic attractions and behaviors focus exclusively or mainly on members of the other sex (IOM, 2011). In the study sample, 577 (7.1%) adolescents self-identified as gay, lesbian, or bisexual; of these youths, 2.6% and 1.6% of adolescents self-identified as gay and lesbian, respectively, and 410 (5.1%) adolescents as bisexual (298 female, 112 male). The grade levels were fairly evenly distributed in the LGB group, with 25.8%, 23.4%, 24.3%, and 26.5% of these youth in 9th, 10th, 11th, and 12th grades, respectively. Overall, race/ethnicity profiles paralleled the proportions found for the overall sample, with 26.7% identifying as Native Hawaiian/Part Hawaiian, 24.3% as Hispanic/Latino, 14.2% as more than one race/ethnicity (multi-racial), 14.0% as Filipino, 10.4% as White, 4.0% as Other Pacific Islander, 2.8% as Other Asian, 2.3% as Japanese, 0.9% as Black/African American, and 0.5% as American Indian/Alaska Native.

Human Subjects Considerations

The Hawai'i State Department of Health and the University of Hawai'i Institutional Review Board approved the survey procedures and protocols for the HYRBS (Saka et al., 2016). For the 2015 survey, a letter to the parent/legal guardian was given to each eligible student instructing the parent to return the signed form to their child's teacher within a week if they did not wish their child to participate in the survey (Saka et al., 2016). Participation in the 2013 HYRBS required written parental permission (Saka

et al., 2013). The survey did not collect identifying information to ensure anonymity of responses, and students recorded their responses directly on a computer scannable answer sheet (Saka et al., 2016). The present study used the de-identified datasets and has approval from the University of Hawai‘i Institutional Review Board.

Measures

Suicidal behavior. Four items in the HYRBS probed for the extent of suicidal ideations and suicide attempts experienced by adolescents in the 12 months preceding the survey. Adolescents were asked to indicate whether they had seriously considered suicide (*yes* or *no*), had made plans to attempt suicide (*yes* or *no*), how many times they had attempted suicide (*0 times, 1 time, 2 or 3 times, 4 or 5 times, 6 or more times*), and whether the attempted suicide resulted in an injury, poisoning, or overdose that had to be medically treated (*I did not attempt, yes, no*). Responses regarding suicidal ideation and suicide planning were coded as 0 = no and 1 = yes. Answers regarding the number of suicide attempts were coded as 0 through 5 (0 = 0 times, 5 = 6 or more times), and responses regarding whether any suicide attempt led to medical treatment were coded as 0 = no/did not attempt and 1 = yes.

Prior studies indicate that suicide ideation generally precedes planning an attempt (e.g., Beck et al., 1979; Husky et al., 2012; Nock et al., 2013), and attempts are preceded by suicide plans (e.g., Prinstein et al., 2008; Stack, 2013). That said, other studies have conceptualized suicide planning as part of suicidal ideation and combined ideation and planning into a single suicide ideation variable that reflects pre-attempt suicidal behaviors (e.g., May & Klonsky, 2011; Perez, 2005). Further, according to the CDC (2016) definition of suicidal self-directed violence, formulation of a suicide plan is subsumed

under the suicidal ideation category. Given that suicidal ideation and suicide planning may reflect a single construct (pre-attempt thoughts and behaviors) rather than two distinct categories, the associations between suicidal ideation and suicide planning as well as bivariate associations between these and the other HYRBS items were examined prior to main analysis.

Suicide-related items are identical in the Hawai‘i YRBS and the YRBSS, and prior YRBSS-based research provides support for reliability and validity of these items. For example, Litwiller and Brausch (2013) reported that a four-item subscale used to examine suicidal ideation and suicide attempts demonstrated an internal consistency coefficient of .88. In another study, Brener and colleagues (2002) found adequate test-retest reliability of the suicide items ($\kappa = 74.3\%$, 66.6% , and 72.7% for suicidal ideation, suicide planning, and suicide attempt, respectively). To examine the test-retest reliability of the YRBSS, Brener and colleagues (2002) administered the YRBSS 2-weeks apart to a sample of high school students. During the administration of the first survey, students were given two identically numbered booklets in an envelope (Brener et al., 2002). Following completion of the survey, students sealed the envelope containing the second booklet and wrote his/her name on the seal (Brener et al., 2002). During the second survey administration, students received the envelope with his/her name and destroyed the envelope after completing the second survey (Brener et al., 2002). The Brener and colleagues (2002) study demonstrated that nearly all YRBSS items including the suicide items have moderate to good test-retest reliability. Further, the results from a psychometric study by May and Klonsky (2011) indicate adequate convergent validity of the YRBSS suicide items with the suicide-related items in the Patient Health

Questionnaire Adolescents (PHQ-A; Johnson, Harris, Spitzer, & Williams, 2002) and the McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al., 2003). In the present study, the suicide-related items demonstrated adequate internal consistency ($\alpha = .75$).

Depression. Depression was assessed using the response to the question “During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities?” Responses were coded as 0 = no and 1 = yes. Although it is a single item estimated measure of depression, subjective reports of feeling sad or loss of interest are major symptoms of depression (American Psychiatric Association, 2013), and many prior studies have used responses to this item as the indicator and the main dependent variable for depressed mood in adolescents (e.g., Milhausen, Yarber, & Crosby, 2003; Naz, Shaikh, & Shaikh, 2004; Paxton et al., 2007; Witte et al., 2008).

Victimization. Six questionnaire items probed whether adolescents had been the target of physical/sexual violence or bullying. Two questions assessed the frequency of dating physical or sexual violence experiences: “During the past 12 months, how many times did someone you were dating or going out with physically hurt you on purpose?”, and “During the past 12 months, how many times did someone you were dating or going out with force you to do sexual things that you did not want to do?”. Answer choices for these items were: I did not date or go out with anyone during the past 12 months, 0 times, 1 time, 2 or 3 times, 4 or 5 times, and 6 or more times. Additionally, four yes/no questions probed whether adolescents had experienced forced sex, bullying, or bullied others: “Have you ever been physically forced to have sexual intercourse when you did

not want to?”, “During the past 12 months, have you ever been bullied on school property?”, “During the past 12 months, have you ever been electronically bullied?”, and “During the past 12 months, have you ever electronically bullied someone?”. Although the item that assessed whether adolescents cyber-bullied others is distinct from other bullying/cyber-bullying victimization items, the results of exploratory and confirmatory factor analyses of this subscale indicated that this item is associated with other bullying victimization items. Given that the majority of youth who cyber-bully others have been the targets of cyber-bullying themselves (e.g., Smith et al., 2008), it is possible that there is some overlap in cyber-bullying-related behaviors.

In this study, given the differences in response options across these items, all responses were initially re-coded as 0 = no/0 times/0 days and 1 = yes/one or more times/one or more days. Inspection of the victimization frequency variable revealed a very strong positive skew, with 60.7% of adolescents reporting no victimization, 16.8% with one victimization, 7.7% with two victimization experiences, and the remaining 14.8% with three or more victimization experiences (range: 0-12). Given the strong skew, the variable was subsequently recoded as 0 = no victimization and 1 = experienced one or more victimization and examined as a binary variable. These items have been used to construct bullying victimization and peer victimization subscales in prior studies, and internal consistencies for these subscales ranged from .45 to .71 (e.g., Litwiller & Brausch, 2013; Moon, Karlson, & Kim, 2015). The victimization subscale in this study demonstrated low internal consistency ($\alpha = .63$). Additional exploratory and confirmatory factor analyses of the subscale did not support any addition or removal of items, thus the scale was retained with the six items.

Self-harm behavior. The HYRBS assessed the occurrence of self-harm behavior by the question: “During the past 12 months, how many times did you do something to purposely hurt yourself without wanting to die, such as cutting or burning yourself on purpose?”. Response options were: 0 times, 1 time, 2 or 3 times, 4 or 5 times, and 6 or more times. Visual inspection of the frequency of self-harm revealed a very strong positive skew, with 87.2% of adolescents reporting no self-harm, 5.7% with one self-harm, and 7.1% with two or more instances of self-harm (range: 0-5). Given the strong skew, prior to analyses, the multiple-choice responses were recoded, and the binary variable (0 = 0 times, 1 = one or more times) was used as the indicator of the endorsement of self-harm behavior. This item has been previously used as the measure of non-suicidal self-injury in adolescents in other studies (e.g., Brausch & Boone, 2015; DeCamp & Bakken, 2016).

Disinhibition. The following eight items in the HYRBS assessed behaviors associated with disinhibition: “During the past 30 days, have you ridden in a car driven by someone, including yourself, who was “high” or had been using alcohol or drugs?”, “During the past 30 days, on how many days did you smoke cigarettes?”, “During the past 30 days, on how many days did you have at least one drink?”, “During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?”, “During the past 30 days, how many times did you use marijuana?”, “During your life, with how many people have you had sexual intercourse?”, “During the past 3 months, with how many people did you have sexual intercourse?”, and “Did you drink alcohol or use drugs before you had sexual intercourse the last time?”. Of these items, three items that probed for the lifetime number of sex partners and alcohol and

marijuana use are identical to those used by Witte and colleagues (2008) to measure impulsivity that also correspond with the items on the Impulsive Behavior Scale (Rossotto et al., 1998).

Multiple-choice response options for the disinhibition items ranged from 0 = 0 days/0 times to 6 = 20 or more days/40 or more times. For the items that assessed the number of sexual partner in the past 3 months and lifetime, answer choices ranged from 0 = I have never had sexual intercourse/I have had sexual intercourse but not during the past 3 months to 7 = six or more people. The disinhibition subscale demonstrated good internal consistency ($\alpha = .81$).

Substance use. Seven HYRBS items assessed how often adolescents used the following substances in the last 30 days: cocaine, heroine, methamphetamine, LSD, inhalants, injection drugs, and prescription drugs (see Appendices A and B for complete HYRBS). The response format included six choices ranging from 0 to 40 or more times. These items were initially coded 0 through 6 (0 = 0 times, 6 = 40 or more times), and subsequently recoded as 0 = did not use substance and 1 = used substance. This subscale demonstrated good internal consistency ($\alpha = .84$).

Violent behavior. Two items in the 2013/2015 Hawai'i YRBS measured violent behavior: "During the past 12 months, how many times were you in a physical fight?" and "During the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor nurse?." Following the strategy used by Sugimoto-Matsuda (2013), a binary variable reflecting "any violence" was created by collapsing these two items into one composite variable (0 = no/0 times on both items, 1 = at least one item was endorsed).

Connectedness. Four items in the HYRBS served as indicators of connectedness: adult support at school (“Is there at least one teacher or other adult in your school that you can talk to if you have a problem?”), adult support outside of school (“Outside of school, is there an adult you can talk to about things that are important to you?”), sports participation (“During the past 12 months, on how many sports teams did you play?”), and academic grades (“During the past 12 months, how would you describe your grades in school?”). Adult support items were coded as 0 = no and 1 = yes. Answers regarding sports participation were coded as 0 through 4 (0 = 0 teams, 4 = three or more teams). However, given the strong skew, responses were subsequently recoded as 0 = 0 teams and 1 = one or more teams. Responses regarding academic grades were coded as 0 = mostly F’s through 4 = mostly A’s.

Perceived school safety. In addition to connectedness, the perceived safety at school was examined as a potential protective factor against the escalation to suicide attempts. In the HYRBS, adolescents were asked: “During the past 30 days, on how many days did you not go to school because you felt you would be unsafe at school or on your way to or from school?” Multiple-choice response options ranged from 0 = 0 days to 5 = 6 or more days. For the purpose of this study, responses were subsequently reverse-coded as 0 = missed school one or more days due to safety concerns and 1 = did not miss school due to safety concerns.

Data Analytic Plan

Preliminary analysis. Prior to main analyses, preliminary analyses were conducted to characterize the study variables and to determine any associations between youth demographic characteristics and the study variables. First, the distributions and

characteristics of the suicide-related variables were explored. Second, demographic statistics (e.g., gender, grade in school, race/ethnicity) associated with suicidal thoughts and behaviors were examined. Third, measures of associations were examined between all study variables.

Structural equation modeling of risk and protective factors for suicidal thoughts and suicide attempts.

First, confirmatory factor analysis was conducted to establish the measurement model for the three factors, disinhibition, substance use, and victimization. Model fit was assessed by inspecting the following three indices; Root Mean Square Error of Approximation (RMSEA; Steiger, 1990; Steiger & Lind, 1980), Comparative Fit Index (CFI; Bentler, 1990), and Tucker-Lewis Index (TLI; Tucker & Lewis, 1973). Based on the literature, the following recommended cutoff points were used in the evaluation of model fit; RMSEA < .05 (Browne & Cudeck, 1993) and CFI /TLI > .95 (Hu & Bentler, 1999).

Based on the present study theoretical framework, structural equation modeling was conducted to examine the direct effects of depression and victimization on suicidal ideation and the direct and interaction effects of the following risk and protective behaviors on suicide attempts: self-harm, disinhibition, substance use, violent behavior, adult support in school, adult support outside of school, sports participation, academic grades, and perceived school safety. Significant interactions ($p < .05$) between health behaviors and suicidal ideation indicate moderation effects that predict the escalation from ideation to attempt.

Models were analyzed using the complex random analysis option in Mplus that accounts for complex survey designs and weights, and the maximum likelihood estimator with robust standard errors (MLR; Yuan & Bentler, 1998) was used. The MLR estimator (Yuan & Bentler, 1998) is robust to non-normality and non-independence of observations, and it is the default estimator in models using complex samples (Muthén & Muthén, 2012). In the analysis of complex survey data with interaction terms, fit indices including chi-square statistic were not available; according to the Mplus developers, chi-square and related fit statistics are not available for this type of analysis as means, variances, and covariances are not sufficient statistics for model estimation (Muthén, 2010). In analyses of such models, model information criteria including loglikelihood, Akaike information criterion (AIC), and Bayesian information criterion (BIC) are used to evaluate the fit of different models (Muthén & Muthén, 2012). AIC is a model selection criterion based on Kulback-Leibler information (Kullback & Leibler, 1951) and can be conceptualized as a “distance” between a model and full reality (Burnham & Anderson, 2004). According to Burnham and Anderson (2004), AIC values are influenced by large sample size, and the individual AIC values are not interpretable. Thus, when comparing candidate models, only the differences in AIC values are examined, and the model with the smallest AIC value is generally selected as the best model (Burnham & Anderson, 2004). The BIC is based on the Bayesian posterior model probability (Raftery, 1995; Schwarz, 1978) and has been found to perform well in a large sample (Burnham & Anderson, 2004). Similar to AIC, smaller BIC values indicate better model fit to the data (Kline, 2005). Alternatively, according to Brown (2006), the MLR chi-square test statistic is asymptotically equivalent to the Yuan-Bentler corrected chi-square statistic

and can be calculated using the scaling correction factor provided in the Mplus output. That said, the chi-square statistic is inflated by large samples (Brown, 2006), and given the large sample size in this study, the chi-square statistic is not likely to be a reliable criterion to evaluate model fit. Thus, to evaluate model fit, AIC and BIC values were examined and compared among candidate models. Lastly, under the complex random model analysis option, only unstandardized parameter estimates were provided, and standardized coefficients were not available. In models with categorical observed dependent variables such as in the present study, unstandardized coefficients reported in the outputs are logistic regression coefficients (Muthén & Muthén, 2012). Accordingly, the unstandardized parameter estimates reported in the present study represent logistic regression coefficients.

Structural equation modeling of risk and protective factors and suicidal progression among LGB youth. Following the main analyses for the full sample, the final model for the overall sample was tested within the LGB youth group. For these analyses, due to the relatively small sample size, the models were constructed using composite subscales. Paralleling the specifications used in the full sample analyses, models were analyzed using the complex random option with the MLR estimator. For these analyses, given that there were no interaction terms with latent variables, standardized parameter estimates were available; thus, for LGB subgroup analyses, standardized parameter estimates are reported.

Data Preparation

Prior to preliminary analyses, the HYRBS data were examined for missing data and any anomalies in responses (e.g., outliers) by examining scatterplots and histograms.

In all analysis, statistical weights were used to account for the complex sampling design of the HYRBS. The weights applied to each student record adjust estimates for the probabilities of school and student selection and nonresponse (CDC, 2016b; Saka et al., 2016). For preliminary analyses, the SPSS 24.0 Complex Samples module was used. The SPSS Complex Samples module has the capability to provide estimates incorporating a variety of complex sampling designs including a two-stage random sampling procedure used in the HYRBS. Main analyses were conducted using Mplus 7.4 (Muthen & Muthen, 2015). In Mplus, weights and sampling designs can be specified in the variable command when analyzing complex survey data.

Missing data. Consistent with the 2013 and 2015 Hawai‘i YRBS codebooks, suicide items were missing some data (ideation 1.6%, plan 1.8%, attempt 14%). Overall, 0.6% of adolescents were missing data on all suicide-related variables. Among youth who were missing responses on the suicide attempt item, 5.3% and 6.5% were also missing responses on the suicide ideation and suicide planning items, respectively. The majority of youth missing responses on the suicide ideation item were also missing data on the suicide plan item (65.3%). Missing data were examined for patterns of missingness and for any associations with relevant variables to determine whether they were missing at random (MAR), missing completely at random (MCAR), or nonignorable missing not at random (NMAR) using the Missing Values Analysis (MVA) module in SPSS 24.0. These analyses did not reveal specific patterns or associations between the suicidality items and other study variables. Thus, it was assumed that missing data were missing at random, and given the large sample size, missing data were not expected to significantly affect study results.

Although Mplus has the capability of handling missing data using the Full Information Maximum Likelihood (FIML) methods, this option was not available for the complex samples analysis design used in the present study. Given that suicidality was the focus of this study and that imputation of missing data for suicide-related variables was deemed inappropriate due to the serious nature of suicidal thoughts and behaviors, listwise deletion was applied to select cases with complete data on suicide variables. Additionally, it was assumed that other study variables were also missing at random, and listwise deletion was applied. All analyses were conducted with complete raw data and the imputed data on non-suicide items, and the results were compared between these analyses. Given that there were no differences between these analyses, the results based on complete data are reported in this study.

Chapter 3. Results

Preliminary Analyses

Table 1 displays the prevalence of all combinations of suicide-related thoughts and behaviors in the sample with complete data on study variables ($N = 8,113$). For the purpose of analysis, the suicidal ideation and behaviors were considered in four overlapping groups that included those who reported any suicide ideation ($n = 1,330$; 16.4%), any suicide planning ($n = 1,246$; 15.4%), any suicide attempts ($n = 798$; 9.8%), and no suicidality ($n = 6,272$; 77.3%). As can be seen in Table 1, there were various patterns of suicidality in the study sample. Notably, there were some exceptions to the anticipated course of suicidality (ideation to plan to attempt) such as those reporting suicide attempts only with no ideation or suicide plans.

Table 1.
Prevalence of Suicide-related Thoughts and Behaviors

	<i>Weighted Frequency</i>	<i>%</i>
Suicide ideation only	3111.82	4.2
Suicide ideation + plan, no attempt	2773.11	4.8
Suicide ideation + attempt, no plan	1894.30	1.2
Suicide ideation + plan + attempt	3726.07	6.2
Suicide plan only	2567.87	3.9
Suicide plan + attempt, no ideation	226.78	0.5
Suicide attempt only	1103.89	1.9
No suicidality	51367.21	77.3

Next, the distributions of the suicide variables were reviewed. As anticipated, the distribution of the suicide attempt frequency variable was strongly positively skewed, with 7,315 adolescents reporting no attempts, 482 with one attempt, and 316 youth reporting two or more attempts. Given the strong skew, the variable continued to demonstrate a positive skew even after various transformations were applied (e.g., log, square root). Exploratory analyses examining potential differences between youth who

made a single attempt and those with multiple attempts revealed that significantly greater proportions of multiple attempters reported depression, self-harm, and substance use, $\chi^2(1) = 36.99, 100.74, \text{ and } 11.70$, respectively, $p < .001$. Multiple attempters also had higher levels of disinhibition than those who reported a single attempt, $F(1, 796) = 16.97$, $p < .001$. Due to the strong skew of this variable, the suicide attempt variable was dichotomized (0 = no attempt, 1 = one or more attempt) and analyzed as a binary variable.

Additionally, analyses were conducted on the suicide ideation and suicide plan variables to determine whether these variables were distinct and should be examined independently or combined into a single variable. Due to the overlap between responses for these two items, for the purpose of this analysis, the following three mutually exclusive groups were compared; 1) suicide ideation and plan, 2) suicide ideation only, and 3) suicide plan only. Correlation analyses were conducted to examine whether these three variables demonstrate distinct patterns of association with other study variables. The results indicated that the strengths and directions of associations between the three suicide-related variables and the study variables were nearly equivalent. Additional series of chi-square analyses and analysis of variance (ANOVA) revealed that these groups did not significantly differ on any of the health behavior variables except for depression, $\chi^2(2) = 26.03, p < .001$. Youth who reported both ideation and suicide planning were more likely to be depressed than those with ideation only, $OR = 1.69$, and youth who reported suicide planning only were less likely to be depressed than those with ideation only, $OR = 0.61$. Given these findings and based on the theoretical formulation that depression contributes to the development of ideation rather than contributing

directly to attempts, the suicide ideation and suicide plan variables were combined into a single variable that reflects pre-attempt suicidal behaviors and termed “suicidal thoughts”. The composite variable was coded as 0 = no suicide ideation or suicide plans, and 1 = suicide ideation and/or suicide plans.

Univariate and Bivariate Analyses

Table 2 presents demographic characteristics associated with suicidal thoughts and attempts. As can be seen in Table 2, 25.6% and 12.1% of female adolescents reported suicidal thoughts and attempts, respectively, whereas 15.2% and 7.2% of male adolescents reported suicidal thoughts and attempts, respectively. Female gender was significantly associated with a greater likelihood of both suicidal thoughts, $\chi^2(1) = 29.39$, $p < .001$, and suicide attempts, $\chi^2(1) = 55.04$, $p < .001$. Grade in school was not significantly associated with suicidal thoughts ($p > .05$), but there was a significant association between grade in school and suicide attempts, $\chi^2(3) = 9.91$, $p = .019$. Chi-square analyses demonstrated that the higher proportions of 9th graders reported making suicide attempts compared to those in other grades. Race/ethnicity was also significantly associated with both suicidal thoughts, $\chi^2(9) = 45.62$, $p < .001$, and suicide attempts, $\chi^2(9) = 80.50$, $p < .001$. Overall, greater proportions of American Indian/Alaska Native, Hispanic/Latino, Native Hawaiian/Part Hawaiian, and multi-racial youth reported suicidal thoughts, and greater proportions of Other Pacific Islander, Black/African American, Hispanic/Latino, and Native Hawaiian/Part Hawaiian youth reported suicide attempts.

Table 2.
Demographic Characteristics Associated with Suicidal Thoughts and Attempts

	Suicidal Thoughts			Suicide Attempts		
	%	χ^2	<i>p</i>	%	χ^2	<i>p</i>
Female	25.6	29.39	< .001	12.1	55.04	< .001
Male	15.2			7.2		
Grade in school		3.48	.323		9.91	.019
9 th	21.2			11.2		
10 th	20.9			8.9		
11 th	21.6			10.4		
12 th	19.3			8.8		
Race		45.62	< .001		80.50	< .001
American Indian/Alaska Native	26.3			10.5		
Black/African American	15.5			13.8		
Filipino	17.8			8.1		
Japanese	16.4			6.8		
Native Hawaiian/Part Hawaiian	21.7			12.6		
Other Asian	18.8			5.9		
Other Pacific Islander	19.0			14.0		
White	16.9			5.2		
Hispanic/Latino	26.0			12.8		
Multi-race/ethnicity	21.6			7.4		

Bivariate correlations between youth characteristics and study variables are shown in Table 3. For bivariate analyses, the following correlations were conducted; Pearson's correlations for associations between two continuous variables, phi-coefficients for associations between two dichotomous variables, and point-biserial correlations for associations between a continuous and a dichotomous variable. As can be seen in Table 3, female gender was positively associated with depression, self-harm, substance use, victimization, academic grades, suicidal thoughts, and suicide attempts ($p < .05$). Negative associations were found between female gender and grade in school, violent behavior, and sports participation ($p < .05$). Higher grade in school was positively associated with disinhibition, substance use, adult support in school, adult support outside of school, and perceived school safety ($p < .05$). Inverse associations were found

between grade in school and depression, self-harm, violent behavior, victimization, sports participation, and suicide attempts ($p < .01$).

Table 3. *Bivariate Correlations between Demographic Characteristics and Study Variables*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Gender (Female)	1														
2. Grade in school	-.02*	1													
3. Depression	.16**	-.03*	1												
4. Self harm	.15**	-.06**	.33**	1											
5. Violent behavior	-.08**	-.04**	.13**	.15**	1										
6. Disinhibition	.00	.21**	.18**	.18**	.34**	1									
7. Substance use	.02*	.06**	.19**	.20**	.23**	.45**	1								
8. Victimization	.09**	-.06**	.30**	.25**	.23**	.19**	.19**	1							
9. Sports participation	-.06**	-.06**	-.05**	-.05**	.03**	.01	-.03**	0	1						
10. Adult support in school	-.00	.08**	-.06**	-.08**	-.03**	-.02	-.04**	-.05**	.07**	1					
11. Adult support outside of school	.02	.03**	-.12**	-.12**	-.07**	-.05**	-.07**	-.07**	.07**	.35**	1				
12. Academic grades	.18**	.00	-.13**	-.07**	-.20**	-.25**	-.16**	-.08**	.07**	-.07**	.09**	1			
13. Perceived school safety	-.02	.05**	-.13**	-.13**	-.14**	-.09**	-.07**	-.17**	.00	.04**	.06**	.13**	1		
14. Suicidal thoughts	.13**	-.01	.43**	.43**	.16**	.20**	.21**	.27**	-.06**	-.07**	-.15**	-.12**	-.13**	1	
15. Suicide attempts	.08**	-.02*	.28**	.38**	.18**	.23**	.20**	.21**	-.03**	-.07**	-.14**	-.16**	-.16**	.49**	1

Note. * $p < .05$. ** $p < .01$.

For examining associations between race/ethnicity and health risk and protective behaviors, a series of chi-square analyses and ANOVA were conducted. Table 4 presents percentages of youth reporting health risk behaviors and means and standard deviations for risk behaviors by race/ethnicity. Overall race/ethnicity differences were found for depression, self-harm, violent behavior, substance use, and victimization, $\chi^2(9) = 83.6, 55.42, 207.19, 166.79, \text{ and } 60.15$, respectively, $p < .001$. One-way ANOVA comparing race/ethnicity groups on mean disinhibition levels revealed significant group differences, $F(9, 8103) = 54.46, p < .001$. Post hoc analyses using Tukey's HSD indicated that Black/African American, Native Hawaiian/Part Hawaiian, and White youth reported significantly higher mean levels of disinhibition than other youth, whereas Filipino, Japanese, and Other Asian youth had significantly lower mean scores on disinhibition compared to other youth. With respect to other health risk behaviors, as can be seen in Table 4, highest proportions of American Indian/Alaska Native, Black/African American, Hispanic/Latino, and Native Hawaiian/Part Hawaiian youth reported being depressed, and highest proportions of Hispanic/Latino and American Indian/Alaska Native youth reported engaging in self-harm. Regarding violent behavior, highest proportions of American Indian/Alaska Native, Black/African American, and Other Pacific Islander youth reported having been in a physical fight. Additionally, greater proportions of American Indian/Alaska Native, Black/African American, Hispanic/Latino, and White youth reported substance use, and greater proportions of American Indian/Alaska Native, Black/African American, and Hispanic/Latino youth reported victimization. Overall,

greater proportions of American Indian/Alaska Native, Black/African American, and Hispanic/Latino youth reported more risk behaviors compared to other youth.

Table 4. *Percentages of Youth Reporting Health Risk Behaviors and Means and Standard Deviation by Race/Ethnicity*

	Depressed (%)	Self-Harm (%)	Violent behavior (%)	Disinhibition Mean (SD)	Substance use (%)	Victimization (%)
American Indian/Alaska Native	63.2	15.8	33.3	3.3 (3.1)	50.0	61.1
Black/African American	39.7	7.1	27.6	3.7 (6.4)	26.3	39.2
Filipino	28.7	10.5	9.2	1.9 (3.1)	10.8	30.8
Japanese	20.2	6.8	5.4	1.4 (2.7)	13.5	23.6
Native Hawaiian/Part Hawaiian	31.8	13.2	19.2	3.6 (4.8)	20.8	33.4
Other Asian	22.8	7.1	5.7	1.3 (3.0)	9.3	23.5
Other Pacific Islander	30.2	7.0	23.5	2.7 (4.2)	12.2	26.3
White	27.1	11.5	14.1	3.2 (5.1)	22.9	34.3
Hispanic/Latino	37.9	16.1	20.7	3.7 (5.3)	24.9	37.9
Multi-race/ethnicity	28.9	13.3	10.2	2.8 (4.3)	16.4	34.4

Table 5 presents percentages of youth reporting protective behaviors and means and standard deviations for academic grades by race/ethnicity. Overall group differences were found for sports participation, adult support in school, adult support outside of school, and perceived school safety, $\chi^2(9) = 170.89, 21.85, 50.20$, and 47.81 , respectively, $p < .001$. One-way ANOVA indicated overall group difference for academic grades, $F(9, 8103) = 54.46, p < .001$. Post hoc analyses using Tukey's HSD revealed that Japanese, Other Asian, White, and multi-racial youth reported significantly higher mean academic grades than the majority of other youth. With respect to other protective behaviors, as can be seen in Table 5, highest proportions of American Indian/Alaska Native and Japanese youth reported sports participation, adult support in school, and adult support outside of school. Greater proportions of Other Asian and Japanese youth reported perceived school safety.

Table 5. *Percentages of Youth Reporting Health Protective Behaviors and Means and Standard Deviation by Race/Ethnicity*

	Sports (%)	Adult Support In School (%)	Adult Support Outside of School (%)	Academic Grades Mean (SD)	Perceived School Safety (%)
American Indian/Alaska Native	70.6	70.6	88.2	2.6 (1.3)	84.2
Black/African American	52.7	69.8	75.4	2.9 (1.1)	94.8
Filipino	42.7	63.2	71.2	3.2 (0.9)	93.8
Japanese	64.9	69.4	82.8	3.4 (0.8)	96.3
Native Hawaiian/Part Hawaiian	60.5	67.7	76.3	2.8 (0.9)	92.9
Other Asian	38.5	59.8	72.7	3.4 (0.8)	96.8
Other Pacific Islander	56.7	64.4	77.9	2.5 (1.0)	88.5
White	55.5	63.7	81.5	3.3 (0.8)	95.7
Hispanic/Latino	54.1	65.9	77.4	2.9 (0.9)	91.3
Multi-race/ethnicity	58.7	68.9	79.4	3.0 (0.9)	94.6

Confirmatory Factor Analysis of Risk Factors

Prior to testing the structural model, the measurement model for the three hypothesized factors, disinhibition, victimization, and substance use, was established using confirmatory factor analysis. For model identification purposes, the metrics for the three latent factors were defined by setting the factor loadings for the items “riding the car while high”, “experienced forced sex”, and “cocaine use” to 1.0 for disinhibition, victimization, and substance use, respectively. The path coefficients for the remaining observed indicators and the error variances were freely estimated.

Confirmatory factor analysis showed that the observed variables loaded highly on their respective factors, and one of the fit statistics indicated good fit, RMSEA = 0.03. However, comparative fit indices, CFI and TLI, indicated relatively poor fit, 0.83 and 0.80, respectively. CFI and TLI are affected by large sample size, whereas RMSEA is unaffected by either sample size or model complexity (Brown, 2006). Thus, based on the RMSEA, the measurement model was determined as adequate. All eight items on the disinhibition factor demonstrated high and statistically significant factor loadings (range: .569 to .866; all $p < .001$). Factor loadings for the six observed variables for the

victimization factor ranged from .370 to .596 and were all statistically significant ($p < .001$). The indicators for the substance use factor also demonstrated high and significant factor loadings (range: .593 to .921, all $p < .001$). Inspection of modification indices (MI) revealed that some substance use items including cocaine, heroine, methamphetamine, prescription, and injection drug use might also load on disinhibition (MI range: 10.10 to 86.40). In addition, modification indices suggested that adding paths between three disinhibition items (cigarette use, alcohol use, and the number of sex partners-lifetime) and substance use (MI range: 21.13 to 50.15) would improve model fit. Although these modification indices suggested that cross-loading some items might improve model fit, for initial analyses, to be consistent with the proposed model and also given that the disinhibition and substance use factors demonstrated good internal consistencies ($\alpha > .80$), the items were retained in the original factors.

Structural Equation Modeling of Risk and Protective Factors for Suicidal Thoughts and Suicide Attempts

Structural equation modeling was used to examine the relationship between health risk and protective behaviors, suicidal thoughts, and suicide attempts. See Figure 1 for illustration of the proposed model. In an evaluation of the proposed model, depression and the victimization factor were entered as predictors of suicidal thoughts, and the main and interaction terms between suicidal thoughts and the risk factors of self-harm, disinhibition and substance use factors, and violent behavior, along with the putative protective factors of adult support in school, adult support outside of school, sports participation, academic performance, and perceived school safety were entered as

predictors of suicide attempts. The model failed to converge, and no parameter estimates were provided.

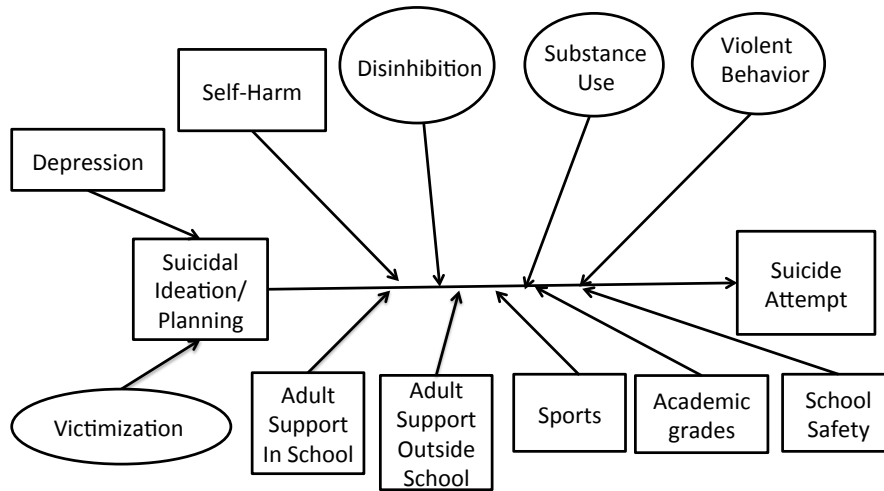


Figure 1. Original proposed model with health behaviors as risk and protective factors of suicidal thoughts and suicide attempts.

Due to the failure of the proposed model to converge, several potential reasons for model non-convergence were considered. According to Brown (2011), potential reasons for non-convergence include model complexity, selection of indicators, and sample size. Given the relatively large sample size of this study and adequate fit found for the measurement model, it was assumed that the proposed model failed to converge due to the model's complexity and improper selection of indicators. Thus, in order to determine the sources of misspecification in the model, the fit of each path in the proposed model was assessed by separately modeling health behaviors and interaction terms with their respective suicide variables.

The results of the analyses indicated that the main effects of two hypothesized risk factors for suicidal thoughts, depression and victimization, were significant, $B = 1.04$

and 9.48, respectively, $p < .001$. Regarding the proposed risk factors for suicide attempts, the disinhibition factor demonstrated significant main and interaction effects, $B = 1.25$ and 1.35 , respectively, $p < .001$. With respect to the proposed protective factors, sports participation showed significant main and interaction effects, $B = -1.64$ and 2.45 , respectively, $p < .001$. Additionally, significant main and interaction effects were found for academic grades, $B = -0.65$ and 0.43 , $p < .001$ and $.012$, respectively. However, the following four risk and protective factors demonstrated significant direct effects only; substance use, violent behavior, perceived school safety, and adult support outside of school, $B = 0.55, 1.14, -1.02, -0.64$, respectively, $p < .001$. The interaction terms for these four variables were not significant ($p > .05$). Lastly, self-harm and adult support in school did not demonstrate either the main or interaction effects ($p > .05$). Based on these results, it was determined that the main sources of misspecification were over-specified interaction terms and model complexity.

According to Brown (2011), one way to re-specify an ill-fitting model is to identify poor fitting indicators and remove such indicators from the model based on empirical and substantive justifications. Thus, removals of poor-fitting indicators were considered, and the alternative revised model with a more parsimonious solution was developed. Adjustments and revisions of the conceptual model were undertaken in several steps; first, based on the results of the prior analyses, misspecified variables were removed from the model, and a revised model was created. Second, a partial revised model with the direct and indirect paths on suicide attempts was examined. Third, the full revised structural model was tested and further refined.

First, based on the results of the previous analyses, a revised model with a more parsimonious solution was developed. See Figure 2 for illustration of the initial revised model. As can be seen in Figure 2, the following five variables were retained from the original model based on their significant loadings in prior analyses; depression and victimization as predictors of suicidal thoughts, and disinhibition, sports participation, and academic grades as risk and protective behaviors associated with suicide attempts. Conversely, given that the interaction effects for substance use, violent behavior, perceived school safety, and adult support outside of school were not significantly associated with suicide attempts, these variables were initially dropped in the revised model and subsequently examined independently following the main analyses of the revised model. In addition, self-harm and adult support in school were also removed from subsequent models given that these two variables did not demonstrate either the main or interaction effects on suicide attempts.

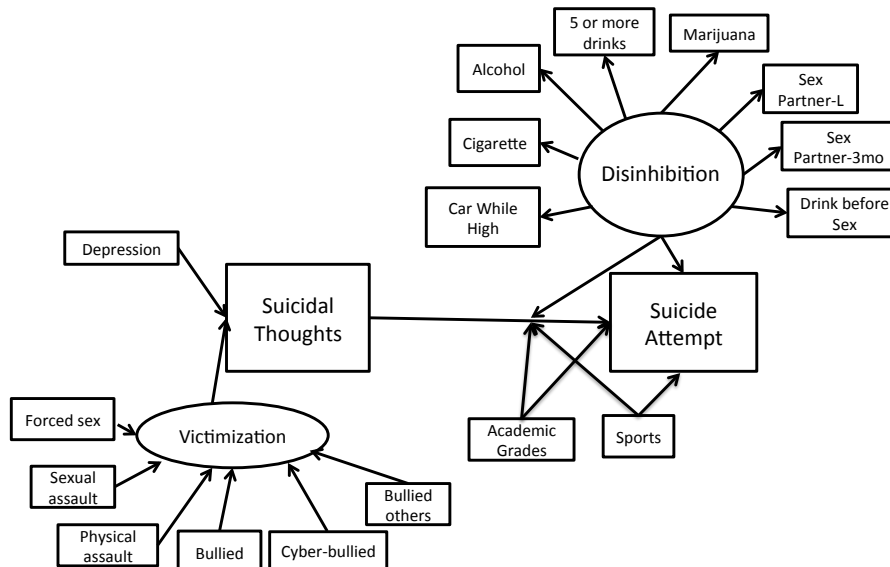


Figure 2. The initial revised model illustrating health risk and protective behaviors of suicidal thoughts and suicide attempts.

Next, a partial revised model was tested; specifically, the paths between suicidal thoughts and attempts and the effects of disinhibition, academic grades, and sports participation on suicide attempts were estimated in this partial model (see Figure 2). The partial model converged, and the following information criteria were obtained: Loglikelihood = -66,370.76, AIC = 132,805.51, and BIC = 132,930.57. In this model, although the main effect of disinhibition was not significant, the interaction effect was significant, $B = 2.14$, $SE = 0.61$, $p < .001$. Both the main and interaction terms for academic grades were significant, $B = -0.59$ and 0.51 , $SE = 0.12$ and 0.14 , respectively, $p < .001$. Sports participation did not demonstrate either the main or interaction effect on suicide attempts ($p > .05$). Lastly, the effect of suicidal thoughts on suicide attempts was not significant ($p > .05$).

Based on the results that neither the main nor interaction effects of sports participation were associated with suicide attempts, the partial model was re-examined after removing sports participation. The following information criteria were obtained for this model: Loglikelihood = -71,552.94, AIC = 143,165.89, and BIC = 143,285.31. In this model, all paths except for the main effect of disinhibition were statistically significant. Although the AIC and BIC values were larger than the previous model indicating that this model was a poorer fit to the data ($\Delta AIC = 10,360.38$ and $\Delta BIC = 10,354.74$), the inclusion of sports participation in the model did not contribute useful information regarding behaviors that potentiate risk for suicide attempts. Thus, sports participation was removed in subsequent analyses.

Next, depression and victimization were fitted to the partial model independently and simultaneously as risk factors for suicidal thoughts, and the overall model fit was

evaluated for each model. The results indicated that although depression was a significant predictor of suicidal thoughts ($B = 2.15$, $SE = 0.08$, $p < .001$), addition of depression to the model led to poorer model fit as evidenced by the larger AIC and BIC values, 161,862.69 and 151,997.71, respectively ($\Delta AIC = 18,696.80$ and $\Delta BIC 8,712.40$). Similarly, although the victimization factor was significantly associated with suicidal thoughts ($B = 9.14$, $SE = 0.96$, $p < .001$), addition of this factor to the model led to poorer fit as indicated by the larger AIC and BIC values, 213,633.20 and 213,844.19, respectively ($\Delta AIC = 70,467.31$ and $\Delta BIC 70,558.88$). Further, addition of depression and victimization simultaneously to the model also led to poorer fit, $AIC = 196,445.06$ and $BIC = 196,651.56$ ($\Delta AIC = 53,279.17$ and $\Delta BIC 53,366.25$). Based on these findings and also given that the present study focused on identifying risk factors for suicide attempts among adolescents with suicidal thoughts, depression and victimization were not included in the full structural revised model.

Parameter estimates (unstandardized coefficients) of the revised structural model are shown in Figure 3. See Table 6 for the coefficients and statistics for the full revised structural model. As can be seen in Table 6, disinhibition demonstrated marginally significant direct effect on suicide attempts, and the interaction effect of disinhibition on suicide attempts was significant. Academic grades demonstrated significant main and interaction effects. Lastly, having suicidal thoughts was also significantly associated with suicide attempts.

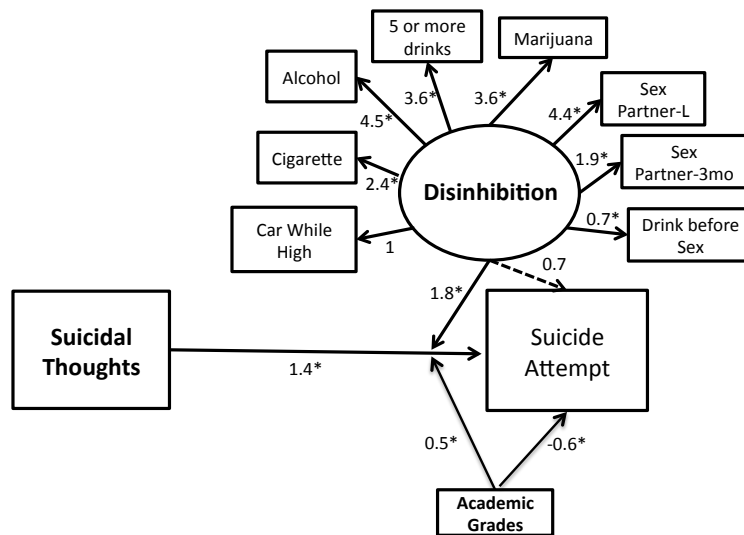


Figure 3. The final structural model illustrating suicidal thoughts, disinhibition, and academic grades as risk and protective factors for suicide attempts.

Note: Values shown are unstandardized beta weights or logistic regression coefficients. Error set at 1.0.

Table 6. Unstandardized Path Coefficients for the Revised Structural Model

Variable	B	SE (B)	z	p
Main effects				
Suicidal thoughts	1.35*	0.52	2.61	.009
Disinhibition	0.73	0.37	1.95	.051
Riding in a car while high	1	-	-	-
Cigarette use	2.38**	0.22	10.62	< .001
Alcohol use	4.50**	0.23	19.94	< .001
5 or more drinks	3.62**	0.20	17.91	< .001
Marijuana use	3.60**	0.14	25.26	< .001
Number of sex partner-lifetime	4.38**	0.25	17.28	< .001
Number of sex partner-30 days	1.91**	0.13	14.71	< .001
Had drink(s) before sex	0.67**	0.05	14.27	< .001
Academic grades	-0.55**	0.11	-5.16	< .001
Interaction effects				
Disinhibition x Suicidal thoughts	1.76*	0.54	3.25	.001
Academic grades x Suicidal thoughts	0.45**	0.13	3.56	< .001

Note. * $p < .01$. ** $p < .001$

Next, follow-up analyses were conducted for disinhibition and academic grades to determine the nature of their significant interaction effects. First, the interaction effect for disinhibition was examined by comparing suicidal thoughts-attempts correlations between high and low disinhibited youth. For the purpose of this analysis, high disinhibition was defined by scores as ≥ 1 SD above the mean, and low disinhibition was defined by scores as ≤ 1 SD below the mean. Analyses indicated that there was a stronger correlation between suicidal thoughts and attempts for high disinhibited youth ($r = .577$) compared to low disinhibited youth ($r = .457$). Further, among high disinhibited youth, 52.5% of those with suicidal thoughts reported attempts, whereas among low disinhibited youth, 30.3% of those with suicidal thoughts reported attempts. Given that the overall prevalence of suicide attempts among youth with suicidal thoughts was 38% in the full sample, these results indicated that greater proportions of high disinhibited youth with suicidal thoughts reported attempts than expected. Second, the interaction effect for academic grades was explored. Paralleling the strategy used for investigating the interaction effect for disinhibition, youth were divided into high and low academic performance groups based on GPA ≥ 1 SD above the mean (high) and GPA ≤ 1 SD below the mean (low). The results indicated that there was a weaker correlation between suicidal thoughts and attempts among youth with high academic grades ($r = .435$) compared to those with low grades ($r = .492$). Additionally, among youth with high academic grades, 27.0% of those with suicidal thoughts reported making attempts, whereas among those with low academic grades, 42.0% of youth with suicidal thoughts reported making attempts. Thus, comparatively fewer proportions of suicidal adolescents

with high academic grades reported making attempts than anticipated based on the full sample prevalence.

Next, the revised structural model was evaluated with gender and grade in school as predictors of suicide attempts to control for the effects of these potential confounding covariates. After controlling for these covariates, all main and interaction effects remained significant. Gender and grade in school were not significantly associated with suicide attempts ($p > .05$). The following model information criteria were obtained for this model: Loglikelihood = -71,545.30, AIC = 143,154.61, and BIC = 143,282.00. Although the AIC and BIC values were smaller than the model without the covariates, only negligible or very small differences were obtained ($\Delta\text{AIC} = -11.28$ and $\Delta\text{BIC} = -3.31$). Given that the covariates did not add any additional information to the model, these variables were dropped from the revised structural model.

Lastly, additional analyses were conducted on the four variables that demonstrated only the main effect on suicide attempts in earlier analyses. In these analyses, substance use, violent behavior, perceived school safety, and adult support outside of school were added to the revised structural model independently, and parameter estimates in each model were examined. Substance use demonstrated significant main effect ($B = 0.46$, $SE = 0.18$, $p = .047$), but the interaction term was nonsignificant ($B = 0.03$, $SE = 0.32$, $p = .931$). Both the main and interaction effects of the remaining three variables were nonsignificant ($p > .05$). Thus, the revised structural model (Figure 3) was determined as the final model for the full sample.

Structural Equation Modeling of Risk and Protective Behaviors of Suicide Attempts Among LGB Youth with Suicidal Thoughts

The next set of analyses examined health risk and protective behaviors associated with suicide attempts among LGB youth with suicidal thoughts. Within this subsample ($n = 577$), 300 indicated no suicidality (52.0%), 259 (44.9%) reported having suicide ideation and/or making a plan to attempt suicide (“suicidal thoughts”), and 154 (26.7%) reported making one or more suicide attempts (“suicide attempts”). As expected, proportions of LGB youth reporting suicidal thoughts and attempts were disproportionately higher than those found for the full sample.

Prior to main analyses, youth demographic characteristics associated with suicidal thoughts and attempts were examined among LGB youth (see Table 7). Female gender was significantly associated with a greater likelihood of both suicidal thoughts and attempts, $\chi^2(1) = 26.96$ and 5.32 , $p < .001$ and $.021$, respectively. As can be seen in Table 7, 53.0% and 29.9% of female adolescents in this subgroup reported suicidal thoughts and attempts, respectively, whereas 30.6% and 21.1% of male adolescents in this subgroup reported suicidal thoughts and attempts, respectively. Grade in school was not associated with either suicidal thoughts or attempts ($p > .05$). Race/ethnicity differences were found for suicidal thoughts and attempts, $\chi^2(9) = 17.13$ and 38.43 , $p = .047$ and $< .001$, respectively. Overall, greater proportions of Japanese, American Indian/Alaska Native, Black/African American, and Native Hawaiian/Part Hawaiian youth in this subgroup reported suicidal thoughts. Further, highest proportions of Black/African American youth reported suicide attempts. Race/ethnicity group proportions for suicidal thoughts and attempts among LGB youth were generally similar to the patterns found for the overall sample except for Japanese youth, whose proportions

for suicidal thoughts were the highest within the LGB subsample but among the lowest in the entire sample.

Table 7.
Demographic Characteristics Associated with Suicidal Thoughts and Attempts among LGB Youth

	Suicidal Thoughts			Suicide Attempts		
	%	χ^2	<i>p</i>	%	χ^2	<i>p</i>
Female	53.0	26.96	< .001	29.9	5.32	.021
Male	30.6			21.1		
Grade in school		1.99	.575		1.80	.614
9 th	47.7			28.2		
10 th	46.7			22.2		
11 th	40.0			27.9		
12 th	45.1			28.1		
Race		17.13	.047		38.43	< .001
American Indian/Alaska Native	66.7			0.0		
Black/African American	60.0			80.0		
Filipino	37.0			17.3		
Japanese	69.2			46.2		
Native Hawaiian/Part Hawaiian	53.9			32.5		
Other Asian	31.3			6.3		
Other Pacific Islander	47.8			47.8		
White	31.7			11.7		
Hispanic/Latino	45.0			32.9		
Multi-race/ethnicity	41.5			18.3		

Table 8 shows bivariate correlations between youth demographic characteristics and study variables for LGB youth. As can be seen in Table 8, female gender was positively associated with depression, self-harm, disinhibition, substance use, victimization, suicidal thoughts, and suicide attempts ($p < .05$). Higher grade in school was positively associated with disinhibition, whereas higher grade in school was inversely associated with self-harm ($p < .05$). Overall, considerably fewer significant associations were found between demographic characteristics and study variables in the LGB subsample compared to the full sample.

Table 8. *Bivariate Correlations between Demographic Characteristics and Study Variables: LGB Youth*

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.
1. Gender (Female)	1														
2. Grade in school	.00	1													
3. Depression	.15**	-.03	1												
4. Self harm	.24**	-.12*	.38**	1											
5. Violent behavior	-.04	-.10*	.11**	.13**	1										
6. Disinhibition	.15**	.16*	.27**	.18**	.40**	1									
7. Substance use	.10*	.03	.20**	.20**	.25**	.42**	1								
8. Victimization	.10*	-.04	.31**	.30**	.20**	.31**	.18**	1							
9. Sports participation	.02	-.03	-.01	-.03	.09*	.09	.01	.06	1						
10. Adult support in school	-.04	.08	-.13**	-.18**	-.03**	-.02	-.06	-.11*	-.04	1					
11. Adult support outside of school	.03	.05	-.04	-.10**	-.06	-.03	-.06	-.12**	-.08	.31**	1				
12. Academic grades	.01	.01	-.14**	-.07	-.20**	-.16*	-.16**	-.05	.04	.08	.02	1			
13. Perceived school safety	-.01	.06	-.10**	-.16**	-.22**	-.14*	-.10*	-.23**	-.12**	.09	.09*	.16**	1		
14. Suicidal thoughts	.22**	-.03	.47**	.46**	.11**	.20**	.23**	.28**	-.02	-.08	-.11*	-.17**	-.13**	1	
15. Suicide attempts	.10*	-.01	.28**	.43**	.26**	.30**	.21**	.25**	.02	-.10*	-.10*	-.17**	-.21**	.53**	1

Note. * $p < .05$. ** $p < .01$.

For the main analysis, the model identified for the full sample using the composite scale for disinhibition was tested (see Figure 4). The following information criteria were obtained for this model: Loglikelihood = -214.63, AIC = 437.26, and BIC = 441.61. Inspection of individual paths in the model revealed that none of the paths were statistically significant ($p > .05$). Given that none of the variables significantly predicted suicide attempts, adjustments and revisions of the model were undertaken, guided by theory and model fit information. First, the hypothesized risk and protective factors for suicide attempts in the original proposed model were fitted and examined independently, and parameter estimates were evaluated for each model. Second, based on theoretical justifications, victimization was tested as a risk factor for suicide attempts.

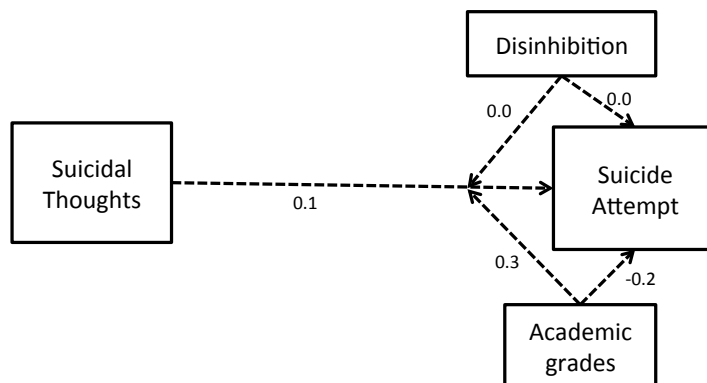


Figure 4. The final full sample model with the composite subscale tested in the LGB subsample.

Given that none of the paths in the full sample model reached significance within the LGB youth subsample, the other putative risk and protective behaviors of suicide attempts in the proposed model (Figure 1) were entered into the model independently, and the paths for each model were examined. The results of these analyses showed that although the main effect of self-harm was nonsignificant ($\beta = -0.32$, $p = .157$), the

interaction effect between suicidal thoughts and self-harm was significant, $\beta = 0.96, p = .001$. Similarly, although the main effect of adult support in school was nonsignificant ($\beta = -0.35, p = .068$), the interaction between suicidal thoughts and adult support in school was significant, $\beta = 0.42, p = .029$. The main and interaction terms for the following variables were nonsignificant: substance use, violent behavior, adult support outside of school, sports participation, and perceived school safety (all $p > .05$). Given these results, the main and interaction terms for self-harm and adult support in school were subsequently entered simultaneously in the model (see Appendix C; alternative model). Although the smaller AIC and BIC values indicated that this model was a slightly better fit model than the initial model tested for this group (AIC = 420.39 and BIC = 427.14; $\Delta\text{AIC} = -16.87$ and $\Delta\text{BIC} = -14.47$), adult support in school did not demonstrate either the main or interaction effect ($p > .05$). Thus, only self-harm was retained in subsequent models.

Next, based on empirical and theoretical justifications, victimization was entered as a risk factor for suicide attempts. According to the study data, significantly greater proportions of LGB youth reported victimization (49.9%) compared to heterosexual youth (31.6%), $\chi^2(1) = 73.83, p < .001$. Moreover, in the final model for the full sample, victimization was dropped as a predictor of suicidal thoughts; thus, the effect of this variable was not tested in earlier models in this subgroup. Further, correlations between victimization and the two suicide-related variables, suicidal thoughts and suicide attempts, were nearly equivalent ($r = .28$ and $.25$, respectively), indicating that victimization may be associated with either suicidal thoughts or attempts in this subgroup. In the literature, victimization has been associated with the increased risk for

suicide attempts in LGB youth but not heterosexual youth (e.g., Hatzenbuehler, 2011; Russell & Joyner, 2001). Further, theoretical formulations such as the minority stress model (Meyer, 2003) have suggested that LGB individuals experience additional stressors associated with their sexual orientation including victimization, which, in turn, potentiate risk for suicide attempts. Given that empirical and theoretical work points to the possibility that victimization might be a risk factor for suicide attempts specifically among LGB youth, victimization was tested as an additional risk factor for suicide attempts.

Parameter estimates for the revised model with self-harm and victimization as predictors of suicide attempts are shown in Figure 5. In this model, the following information criteria were obtained: Loglikelihood = -180.44, AIC = 372.87, and BIC = 379.44. Compared to the initial model, the AIC and BIC values for this model were smaller, indicating that this was a better fitting model ($\Delta AIC = -64.39$ and $\Delta BIC = -62.17$). As can be seen in Figure 5, suicidal thoughts significantly predicted suicide attempts, $\beta = 0.60$, $SE = 0.21$, $p = .005$. Although the main effect of self-harm was nonsignificant ($\beta = -0.30$, $SE = 0.32$, $p = .347$), the interaction effect of self-harm on suicide attempts was significant ($\beta = 0.90$, $SE = 0.34$, $p = .017$). Similarly, although victimization did not demonstrate significant direct effect on suicide attempts ($\beta = -0.03$, $SE = 0.17$, $p = .837$), the interaction between victimization and suicidal thoughts significantly predicted suicide attempts ($\beta = 0.56$, $SE = 0.22$, $p = .010$).

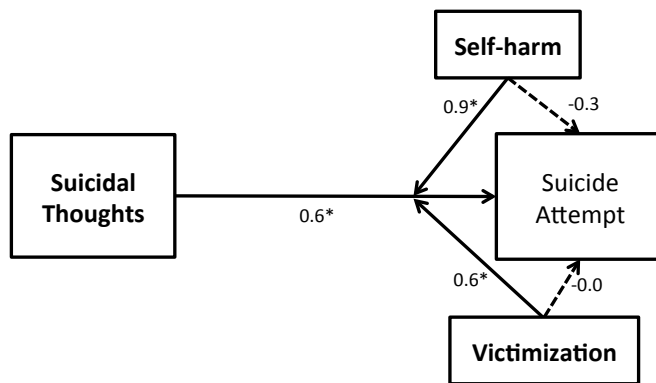


Figure 5. Final model showing self-harm and victimization as risk factors for suicide attempts among suicidal LGB youth.

Note: Values shown are standardized beta weights.

Next, additional analyses were conducted to investigate the nature of the significant interaction terms. Analyses on the interaction effect of self-harm on suicide attempts revealed that among those who reported self-harm in this subsample, 67.1% of LGB youth with suicidal thoughts reported making suicide attempts. Conversely, among those who did not report self-harm, 33.0% of LGB youth with suicidal thoughts reported making attempts. Within this subgroup, the overall prevalence of suicide attempts among those with suicidal thoughts was 52.5%. Correlations between suicidal thoughts and attempts were higher among LGB youth who reported self-harm ($r = .495$) compared to LGB youth who did not report self-harm ($r = .375$).

Results of the analyses explicating the interaction effect of victimization found that among those who reported victimization in this subsample, 58.0% of youth with suicidal thoughts reported making suicide attempts, whereas among those who did not report victimization, 41.8% of youth with suicidal thoughts reported making attempts. In addition, correlations between suicidal thoughts and attempts were slightly higher in LGB

youth with victimization ($r = .512$) compared to LGB youth without victimization ($r = .496$).

Lastly, gender and grade in school were entered as covariates in the revised model to control for any shared variance with these potential confounds. None of the covariates significantly predicted suicide attempts (all $p > .05$), and the model remained unchanged. The information criteria showed only negligible change from the model without the covariates, AIC = 369.44 and BIC = 377.80 (Δ AIC = -3.43 and Δ BIC = -1.64). Given that the addition of potential covariates did not yield additional information, the revised model without the covariates was selected as the final model for LGB youth.

Comparing the Effects of Health Risk and Protective Behaviors of Suicide Attempts between LGB and Other Youth

The third set of analyses compared health risk and protective behaviors of suicide attempts between LGB and non-LGB youth with suicidal thoughts. Multi-group measurement invariance evaluation is commonly conducted in a stepwise sequence; 1) configural invariance analysis to determine whether the factor structure is equivalent across groups, and 2) metric invariance analysis to test the equality of factor loadings and residuals (Brown, 2006). Following this sequence, configural invariance analysis was conducted on the combined data to determine if the full sample model with composite subscales can be applied equally to both the LGB and non-LGB youth groups. In this analysis, all parameters were free to vary, and the equivalence of factor structures was tested by “stacking” the CFA analysis on one group on top of the other, similar to conducting the analysis in a single group (Brown, 2006).

The test of the equivalence indicated that the model is not invariant, $\chi^2 (10) = 65.179, p < .001$. Inspection of parameter estimates and modification indices revealed that although modification indices did not suggest specific path modifications, the path coefficients for disinhibition and disinhibition x suicidal thoughts were significant only for the non-LGB group. Given that the results did not support the appropriateness of conducting multi-group analyses using the full sample model on the combined data, the best fitting model for LGB youth was tested. The results continued to indicate that the model cannot be applied equally across both groups, $\chi^2 (10) = 133.60, p < .001$. Given that configural invariance was not supported, metric invariance or weak factorial invariance was not evaluated.

Chapter 4. Discussion

This study used structural equation modeling to examine health behaviors as risk and protective factors for suicide attempts among adolescents with suicidal thoughts. Additionally, a goal of the study was to broaden our understanding of suicidality among LGB youth. The findings contributed new insights on factors that predict and, thus, might influence the escalation to attempts among adolescents with suicide ideation. Overall, the findings supported a component of the theories grounded in the ideation-to-action framework (Klonsky & May, 2014), suggesting that disinhibition potentiates suicide attempt risk in suicidal adolescents. Concurrently, high academic performance seemed to protect against suicide attempts in adolescents with and without suicidal thoughts. Several hypothesized risk and protective factors and moderation effects were not supported, however, and the prediction model for the full sample was not a good fit for the subgroup of LGB youth. In contrast to the risk factors identified for the full sample, self-harm and victimization potentiated suicide attempt risk in LGB youth with suicidal thoughts. Further, none of the protective factors explored were significantly associated with suicide attempts in LGB youth. These expected and unexpected findings both support the potential for identification of suicide risk, and suggest new areas of focus for prevention and interventions for adolescents generally and also specifically among LGB youth.

Health Behaviors as Risk and Protective Factors for Suicide Attempts among Adolescents with Suicidal Thoughts

Consistent with the first hypothesis, disinhibition potentiated suicide attempt risk among adolescents with suicidal thoughts in the full sample. The present finding

provides partial support for Joiner's model (2005), which posits that impulsivity, a dimension of disinhibition, confers indirect risk for suicide attempts. Specifically, impulsivity is thought to lead to experiencing painful and provocative events, which, in turn, lead to habituation to pain and reduction of fear associated with suicide, increasing one's capability to act on suicidal thoughts (Joiner, 2005). However, the support for this model is limited, given that exposure to painful and provocative events could not be determined in the current data. Nevertheless, the finding extends our current understanding of the association between behavioral disinhibition and suicide attempts. Previous research has indicated that behavioral disinhibition is a risk factor for suicide attempts without addressing the mechanism by which suicidal thoughts lead to actions (e.g., Mann et al., 1999; Witte et al., 2008). The current finding suggests that high levels of disinhibition act in concert with suicidal ideation and contribute to higher risk for suicide attempts by increasing the danger associated with suicide ideation in youth with suicidal thoughts. Given that most risk factors identified in the literature predict suicide ideation only and not the escalation to attempts (Klonsky et al., 2015), this study provides promising preliminary evidence that high disinhibition may be a unique risk factor that precipitates the escalation from thinking about suicide to acting on such thoughts among adolescents.

As expected, high academic performance as measured by self-reported grades was associated with lower suicide attempt risk among youth with suicidal ideation as well as those without suicide ideation. The finding is consistent with prior research that showed the link between academic achievement and a lower risk for suicidal behaviors (Bridge, Goldstein, & Brent, 2006; Fergusson, Beautrais, & Horwood, 2003; Hall-Lande,

Eisenberg, Christenson, & Neumark-Sztainer, 2007). Although speculative, it is possible that the positive effects of academic achievement might be in part due to connectedness to school and/or education. Prior research has demonstrated that strong connectedness to school is positively associated with students' academic motivation, feelings of belonging, and emotional well-being (Roeser, Eccles, & Sameroff, 2000). Such benefits of connectedness to school may extend to suicidality. It may be that positive academic motivations and aspirations are associated with hopefulness regarding school and/or education goals. Given that hopefulness is thought to increase coping abilities and impede the escalation to attempts (Range & Penton, 1994), it is possible that hopefulness and positive motivations regarding learning or school/education might serve to protect against suicide attempts. Alternatively, connectedness to school might be associated with greater feelings of belonging, and such feelings may counteract the adverse effects of low social support associated with suicide ideation (Beck, 1986; Beck et al., 1993; Dhingra et al., 2015). Taken together, it is logical to assume that youth with stronger academic performance are more connected to school and/or educational goals, which, in turn, might serve to reduce the risk for suicide attempts in youth generally as well as specifically among youth with suicidal thoughts. Further studies are needed to explicate how academic performance exerts protective influences on suicide attempts when suicidal ideations are present.

Contrary to expectations, although several risk and protective behaviors showed main effects on suicide attempts, these behaviors did not demonstrate anticipated associations with the transition from ideation to attempts. Specifically, the hypothesis regarding self-harm, substance use, and violent behavior as risk factors for suicide

attempts in adolescents with suicide ideation was not supported. In addition, there was no support for the hypothesized associations between suicide attempts and protective factors in adolescents with suicidal thoughts including adult support in and outside of school, sports participation, and perceived school safety. Further, some health risk behaviors including depression and victimization were associated with suicidal thoughts rather than suicide attempts. Given that these variables were correlates of suicidal thoughts, the effects of depression and victimization on suicide attempts were only indirect through suicidal ideation. Thus, depression and victimization were removed from the final model.

With respect to self-harm, this hypothesized risk factor was not associated with suicide attempts in the full sample. Thus, the finding did not support the components of Joiner's theory (2005) and the IMV model (O'Connor, 2011) that speculate self-injury as one of the risk factors for suicide attempts. Given that these theoretical formulations are focused on suicidal behaviors in adults, the applicability of these theories on adolescents is relatively unknown (Czyz, Berona, & King, 2014; Steward et al., 2017). Moreover, it is possible that the effects of self-harm on suicide attempts may differ between community samples of adolescents and inpatient samples typically used in suicide research. Thus, there is a possibility that among adolescents generally, self-harm may not confer risk for suicide attempts. Alternatively, clinical and empirical work suggests possible alternative mechanisms for self-harm. For instance, Linehan and other researchers have conceptualized self-harm as a maladaptive coping mechanism used by individuals to regulate intense negative emotions and emotional distress (e.g., Brown, Comtois, & Linehan, 2002; Linehan, 1993; Nock & Kessler, 2006). The clinical

literature suggests additional paradoxical ways in which deliberate self-harm may function, such as to relieve feelings of depression and to externalize emotional pain (Gratz, 2003). Thus, it may be the case that among adolescents generally, self-mutilation or burning oneself may be more strongly associated with depression and suicide ideation than suicide attempts. Additionally, as will be discussed below, self-harm may be a risk factor for suicide attempts among specific subgroups of adolescents such as LGB youth.

In contrast to theory and the results of prior YRBSS-based research (Wong et al., 2013), the hypothesis regarding substance use as a risk factor for suicide attempts was not supported in this study. It is possible that the expected finding might have failed to occur in part due to sample characteristics and the measurement in this study. Substance use in the current study referred to the use of hard substances including cocaine, methamphetamine, heroine, and LSD. These substances were distinguished from the more common substances (alcohol, cigarette, marijuana) that were examined as indicators of behavioral disinhibition. Given that the use of hard substances was relatively rare in this sample, any effects of these substances on suicide attempts might have been too small to detect in the current study. Additionally, analyses of the measurement model showed that the indicators on the substance use factor were correlated with the indicators on another factor, suggesting that some of the substance use items were nonspecific. Thus, the weak factor structure of the substance use factor limits the conclusions that can be drawn regarding the non-effects found for substance use. Alternatively, it is possible that as suggested by prior research (Wong et al., 2013), the frequency and intensity of substance use and the number of substances used, rather than the endorsement of ever having used illicit substance, potentiate suicide attempt risk. In this study, given that the

responses examined were based on adolescents who were present in school on the day of survey administration, the study sample did not include youth who may have been absent due to substance use, in treatment, or suspended or expelled from school for substance-related problems. Thus, it is possible that substance use among adolescents in this study was generally indicative of more recreational use of drugs rather than heavy substance use. Possibly, youth who develop severe substance use-related problems such as substance use disorders might be more at risk for suicide-related problems than those who only experiment with or casually use illicit substances.

Additionally, the hypothesis regarding violent behavior as a risk factor for suicide attempts was also not supported in the model. It is possible that the single-item composite measure used to assess violent behavior did not adequately capture the violent behavior construct. Although exploratory factor analysis indicated that violent behavior was a distinct factor, correlation analyses showed that this subscale was associated with the disinhibition, substance use, and victimization factors. Thus, it is possible that shared variance with other factors obscured any unique contribution of this variable.

Alternatively, it is possible that another formulation might explain the unexpected association between violent behavior and suicide attempts. It may be that youth who engaged in physical fighting were not at an increased risk for suicide attempt due to having been referred to school interventions or medical/other treatments. In a community sample, up to one-half of clinical referrals among children are due to aggressive behaviors (Kazdin, Esveltd-Dawson, French, & Unis, 1987). Therefore, it can be speculated that getting in a physical fight, particularly if it occurs at school, may increase the likelihood that youth receive some interventions at school or that they are referred to

medical/psychosocial treatment, which, in turn, could address depression or suicidal thoughts if present.

In contrast to the expectation that indicators of connectedness such as adult support in and outside of school and sports participation would serve as protective factors against suicide attempts, the current findings did not provide support for the protective roles of these behaviors. Additionally, another hypothesized protective factor, perceived school safety, also failed to predict suicide attempts. A possible explanation for the unexpected findings is that the effects of protective factors on suicide attempts were accounted for by suicidal ideation. Although some research on the protective role of connectedness on suicide attempts accounted for the effects of suicidal ideation (Klonsky & May, 2015), other studies did not control for the variance associated with suicidal thoughts (Borowsky et al., 2001; Bridget et al., 2006). Thus, it is possible that the effects of the suicide protective factors found in the literature are only indirect through suicide ideation, and such factors do not uniquely predict the escalation to attempts.

Alternatively, it may be that the indicators of connectedness examined in this study such as adult support in and outside of school might have been too broad and did not adequately capture the connectedness construct. More specific indicators of connectedness such as the quality of relationships with parents, other family members, school counselors, and religious/cultural figures might unearth different findings.

Interestingly, although the hypothesis regarding adult support in school as a protective factor against suicide attempts was not supported in this study, high academic performance was associated with lower suicide attempt risk. Thus, there remains a possibility that individual-level factors such as one's educational goals and motivations to

learn, rather than social factors such as adult connections in school, might exert protective influence on adolescent suicidality. Additionally, given that these protective factors were examined as binary variables, it is possible that any nuanced effects of these variables on suicide attempts could not be detected.

Although depression and victimization were not components of the final model for the full sample, there was partial support for the proposed associations of suicidal thoughts with depression and victimization. Given the strong theoretical and empirical evidence for the link between depression and suicide ideation (e.g., Beck, 1986; Kessler et al., 1999), it is not surprising that depression was associated with suicidal thoughts in the current study. Similarly, the finding regarding victimization was consistent with prior research (e.g., van Geel et al., 2014; Klomek et al., 2007). Although these variables were not included in the final model due to model parsimony and based on model fit, there is evidence that indicates that depression and victimization are risk factors for suicidal thoughts.

Health Behaviors as Risk and Protective Factors for Suicide Attempts among LGB Youth with Suicidal Thoughts

Regarding the second study hypothesis, which proposed that the full sample model would also apply to LGB youth, in contrast to expectations, the model developed for the full sample was not supported for LGB youth. Contrary to the full sample model, the best fitting model for LGB youth indicated that among this subsample, the interaction between suicidal thoughts and the two risk factors, self-harm and victimization, not disinhibition and academic grades, predicted the escalation to attempts.

It is noteworthy that although self-harm and victimization were not directly associated with suicide attempts in the full sample, among LGB youth with suicide ideation, self-harm and victimization experiences, such as physical/sexual assault, bullying, and cyber-bullying, potentiated suicide attempt risk. This finding is commensurate with prior research that indicated that LGB youth who reported victimization experiences are at significantly greater risk for suicide attempts than heterosexual youth who also reported victimization experiences (e.g., Burton et al., 2013; Bontempo & D'Augelli, 2002; Russell & Joyner, 2001). In a similar vein, the finding regarding higher rates of self-harm among LGB youth compared to other youth is consistent with prior research (e.g., Almeida et al., 2009; Burton et al., 2013; DeCamp & Bakken, 2016). Further, the present findings corroborated prior research regarding disproportionately higher rates of suicidal thoughts and suicide attempts in LGB youth compared to other youth (e.g., D'Augelli et al., 2005; Hatzenbuehler, 2011; St. John, 2015).

The finding regarding self-harm as a risk factor for the transition from suicide ideation to attempts among LGB youth with suicide ideation highlights the possibility that some mechanisms underlying self-harming behaviors might differ between LGB and other youth. A study by Scourfield and colleagues (2008) on LGB youth experiences provides two possible explanations for the link between self-harm and LGBT identity. First, LGB youth may engage in self-harm to express their unhappiness regarding their sexual orientation (Scourfield, Rosen, & McDermott, 2008). Specifically, self-harm behavior may serve as a self-punishment, particularly if these LGB youth are struggling with their sexual orientation identification and/or are experiencing emotional distress

regarding self and others' perceptions of their sexual orientation (Scourfield et al., 2008). Thus, self-harm may reflect externalization of emotional distress regarding one's sexual orientation, which, in turn, potentiates risk for a range of self-directed injurious behavior including self-harm and suicide attempts in vulnerable youth. Second, LGB youth may self-harm in response to adverse experiences such as victimization related to their sexual orientation (Scourfield et al., 2008). In this vein, self-harm may be a behavioral indication of anger, emotional pain, or frustration related to adverse experience. Accordingly, LGB youth who are already struggling with adverse experiences might be at greater risk for suicide attempts when suicidal thoughts are present and such thoughts are accompanied by self-harm behaviors.

Apart from experiencing more victimization, the greater impact of self-harm and victimization for this group might be observed because these behaviors occur in the context of high levels of other stressors. It is possible that given additional developmental challenges associated with LGB sexual orientation, any effects of life stressors such as victimization experiences may be intensified in these youth (e.g., Burton et al., 2013; D'Augelli et al., 2001; Garnets, Herek, & Levy, 1990). According to the minority stress model (Meyer, 2003), LGB individuals experience additional stressors associated with their sexual orientation status such as stigma and prejudice, which, in turn, increases their risk for adverse health outcomes including suicide ideation and attempt. Notably, prior research has found that nearly half of LGB youth who attempted suicide reported that their attempts were related to their sexual orientation (D'Augelli et al., 2001; D'Augelli et al., 2005). Further, longitudinal research on LGBT adolescents indicated that victimization related to sexual orientation was associated with both self-

harm and a history of attempted suicide (Liu & Mustanski, 2012). Therefore, it is plausible that among LGB youth with vulnerabilities to suicidality, any victimization experiences, particularly those viewed as associated with their sexual orientation, might heighten their risk for self-directed violence including self-harm and suicidal behaviors.

In contrast to the full sample, disinhibition and academic grades were not associated with suicide attempts in LGB youth with suicide ideation. The failure to find support for the effect of disinhibition on suicide attempts is surprising given that LGB youth reported higher levels of disinhibition compared to other youth. It is conceivable that within the context of LGB youth experiences and associated minority stress processes (Meyer, 2003), the effects of victimization and self-harm outweigh the effects of disinhibition and academic performance on the escalation to suicide attempts.

Alternatively, it is possible that health risk behaviors that indicate disinhibition may be comparable or different between LGB and other youth. Given that disinhibition was examined as a composite subscale in the subgroup analyses, any nuanced effects of disinhibition on suicide attempts among LGB youth with suicide ideation were not evaluated in the study. Lastly, given the relatively small sample size for this subgroup with suicide ideation, it is possible that there was limited statistical power to detect significance in the subgroup analyses.

Comparing the Effects of Health Risk and Protective Behaviors on Suicidal

Progression between LGB and Other Youth

Regarding the third study aim, which was to compare health risk and protective behaviors of suicide attempts between LGB and heterosexual youth, none of the alternative models supported configural invariance, indicating that the patterns of risk and

protective factors of suicidality were distinct between LGB and non-LGB youth. Configural invariance analysis indicated that the effects of disinhibition on suicide attempts significantly differed between these two groups. Specifically, the indirect effects of disinhibition on suicide attempts were relevant only in the full sample and not among LGB youth. This finding converges with the aforementioned result for the second study aim.

Notably, the finding that none of the models could be applied to both LGB and non-LGB youth suggests that some health risk and protective behaviors associated with suicidality may be unique to LGB youth and their experiences. Specifically, given that self-harm was associated with elevated risk for suicide attempts among LGB youth with suicide ideation but not in other youth, it is possible that functions and antecedents of self-harm behavior among suicidal LGB youth may differ from other youth who engage in self-harm. It may be that among LGB youth with suicidal thoughts, self-harm might serve as practice for suicide attempts as suggested by Joiner's model (2005), whereas among non-LGB youth with suicide ideation, self-harm might be a strategy to regulate intense negative emotions (e.g., Brown et al., 2002; Linehan, 1993). Moreover, it is possible that motivations for self-harm may differ between LGB and other youth with suicidal ideation. Further research on the mechanisms and motivations regarding self-harm may provide additional insights on self-harm behavior among LGB youth with suicide ideation.

Additionally, the higher prevalence of victimization and its association with suicidal behaviors specifically among LGB adolescents with suicide ideation raise concerns about these youth' experiences in high school and beyond. More research is

needed to further clarify the associations between victimization and suicidal behaviors, and the potential moderators/mediators of these associations. For example, it has been suggested that victimization experiences that occur at school are more strongly associated with suicidal ideation and behaviors compared to other types of victimization such as cyber-bullying (Bouris et al., 2016). Additionally, other factors such as family support and self-acceptance have been found to mediate the association between victimization and suicide and reduce suicide attempt risk in LGB youth (Hershberger & D'Augelli, 1995). Thus, if additional correlates or potential moderators/mediators of the associations between victimization and suicide attempts could be identified, such factors may then be incorporated as potential targets of prevention intervention efforts specifically for LGB youth with suicide ideation.

Limitations

Although the present study broadens previous research on the progression of suicidality in adolescents and also specifically among LGB youth, limitations to this study should be considered when evaluating the results. First, the cross-sectional nature of the current data limits conclusions that can be drawn regarding the temporal sequence of health risk/protective behaviors and suicidal thoughts/behaviors. Additionally, given that some adolescents attempt suicide without premeditation, further research should incorporate potential differences between attempters with and without ideation and/or planning. Second, given that this study was based on archival data, many important aspects of suicidal thoughts and behaviors such as the frequency and intensity of suicide ideation, suicide plan methods, intent of suicide attempts, and the details of suicide attempts were unavailable. In addition, the nature of missing data for the suicide attempt

item could not be determined from the current data; thus, it is unknown whether responses were missing due to youth not willing to disclose any history of suicide attempts or other reasons. Further, the current study was based on school samples of attempt survivors, thus the applicability of the identified model to those who died by suicide is unknown. The literature indicates that there are some notable differences between attempt survivors and those who died by suicide such as gender (males are more likely to die by suicide because of the use of more lethal methods), substance use, and family history of suicide (e.g., Gould et al., 2003; Qin, Agerbo, & Mortensen, 2002). Therefore, it is possible that risk and protective behaviors associated with death by suicide may differ from those identified in this study. Additionally, although the study results indicated that youth with multiple attempts have more severe problems compared to those with a single attempt, any distinctions could not be accounted for in the study analyses. Further research using retrospective longitudinal design is needed to examine distinctive features of multiple attempters.

Relatedly, potential risk and protective health behaviors examined in the current study were limited to the items on the HYRBS survey. As a result, this study was restricted to developing scales based on theoretical constructs and face validity. Some of the constructs were assessed using a single-item or two-item scales, which may limit the reliability of responses for these items. Given the paucity of research that examined the reliability and validity of the YRBSS/HYRBS items, additional research examining psychometric properties of the YRBSS/HYRBS measures is needed. Additionally, other well-known risk and protective factors such as psychopathology, family history of suicide, childhood physical/sexual abuse, and family support could not be examined.

Notably, prior research by Hishinuma and colleagues (2017) found that anxiety is a significant risk factor for suicide attempts in Hawai‘i’s high school students. Given that there was no item in the HYRBS that measured anxiety or behaviors that could serve as proxies for anxiety, any potential effect of anxiety on suicidality could not be examined in the current study.

There are other limitations with respect to the sampling in the study. For example, given that information about transgender youth was not available, it is unknown whether the present findings may reflect characteristics of LGB youth only or extend to transgender youth. Given that limited research has found high rates of suicide attempts among transgender individuals (e.g., Clements-Nolle, Marx, & Katz, 2008; Goldblum et al., 2012), research on suicidal behaviors in this subgroup of youth is needed.

Additionally, given the relatively small LGB youth sample, more fine-grained analyses such as examining different predictive models for gay, lesbian, and bisexual youth could not be conducted. Moreover, the surveys were conducted in public high schools, and it is unknown whether the findings extend to those attending private schools or home-schooled. In addition, the survey did not include youth who were absent from school on the day of the survey administration such as those who may have been suspended, expelled, dropped out from school, incarcerated, or receiving inpatient treatment. Thus, the applicability of the present finding to youth who are not in school due to severe emotional and/or behavioral problems is unknown. Lastly, given that this study was based on self-reports, responses were subject to recall and other biases associated with self-reports. Further research is needed to establish the reliability and validity of this survey.

Implications for Research

The current study findings highlight the importance of clarifying risk and protective factors associated with the escalation from suicide ideation to attempts above and beyond suicide ideation. Specifically, the results suggest that among a wide variety of risk and protective behaviors examined in this study, behavioral disinhibition potentiates risk for suicide attempts among youth with suicide ideation. Given that this study was based on a community sample of adolescents using a survey designed to primarily assess for health risk behaviors, the finding is preliminary and needs replication using measures specifically designed to evaluate behavioral disinhibition. Research examining associations between suicide attempts and specific aspects of disinhibition such as failing to inhibit a response or acting without thinking (Janis & Nock, 2009) could be useful in illuminating how behavioral disinhibition potentiates suicide attempt risk. Interestingly, the results indicate that among those without suicide ideation or planning, levels of disinhibition are not associated with suicide attempt risk. Although counterintuitive, it is possible that as suggested in prior studies (e.g., Simon et al., 2001; Witte et al., 2008), other factors such as exposure to painful events or interpersonal conflicts, rather than disinhibition, might potentiate risk for suicide attempts in adolescents who impulsively attempt suicide.

The finding regarding academic grades suggests that school and/or education-related factors may play important roles in preventing suicide attempts in adolescents with or without suicide ideation. Given the present study data, many protective aspects of academic achievement such as motivations, school environment, family support, emotional and academic competence, and connectedness to peers could not be

determined. Further, in contrast to the present study, some prior research has found that poor academic achievement is an indirect risk factor for suicide attempts (see Evans et al., 2004, for a review). Thus, it seems that academic performance has both risk and protective roles, with poor performance potentiating risk, and good performance reducing risk. Further research focused on explicating the protective effects of academic achievement could illuminate specific factors associated with lower suicide attempt risk.

With respect to LGB youth, the current findings about the disproportionately high rates of self-harm and suicidal thoughts and behaviors among LGB youth are alarming and warrant further understanding of these behaviors in these vulnerable youth. Given that many prior studies on suicidality among LGB youth examined LGB youth only and did not compare correlates of suicidality between LGB and other youth (e.g., Anhalt & Morris, 1998; Savin-Williams, 1994), potential differences in suicidality between these youth are relatively unknown. Thus, further research that compares a wider range of risk and protective factors associated with the escalation to attempts between LGB and other youth could extend the present study. Additionally, given the additional developmental challenges associated with LGB sexual orientation, it is possible that there are other unique factors such as acceptance of one's sexual orientation that might impact suicide attempt risk in LGB youth with suicide ideation.

The current study suggests the need for further research on race/ethnicity differences in suicide-related outcomes in youth generally and specifically among LGB youth. Overall, the current study corroborates prior research that found that Native Hawaiian youth are at higher risk for suicidal thoughts and behaviors (e.g., Goebert et al., 2014; Wong et al., 2012). Although fine-grained analyses of race/ethnicity differences

on the transition from ideation to attempts were beyond the scope of this study, the current study presents preliminary evidence that the transition from suicide ideation to attempts differs by race/ethnicity. Further research to understand risk and protective factors associated with the escalation of suicidality among each race/ethnicity group could reveal specific targets for prevention and intervention that can be tailored by youth's race/ethnic backgrounds. Moreover, the paucity of research on race/ethnicity differences in suicidality among LGB youth limits knowledge about potential effects of one's race/ethnicity on suicidal behaviors in these youth (Russell & Fish, 2016). Although analyses of gender and race/ethnicity differences on the transition from ideation to attempts could not be conducted within the LGB youth subsample in this study, replication using larger data sets could be useful to determine whether there are differences in suicide attempt risk between LGB and heterosexual youth with suicide ideation and by their race/ethnicity. Further, given Hawai'i's unique geographic location and diverse populations, it is possible that experiences of adolescents generally and LGB youth in Hawai'i may differ by race/ethnicity. Additional research may reveal important race/ethnicity group differences that can be incorporated into prevention and intervention programs.

Future Research Directions

Overall, the present study provides preliminary information on health behaviors that influence suicide attempt risk in adolescents and LGB youth who have suicidal thoughts. Suicidal behaviors are complex phenomena, and factors associated with suicidal thoughts and behaviors in adolescents encompass psychological, biological, familial, personal, and social domains (Evans et al., 2004). Thus, an important direction

for future research on youth suicide is the development of more complex models that integrate risk and protective factors for suicidality across multiple domains, such as the familial and social risk factors associated with suicidal behaviors. Additionally, the trajectories of suicidal ideation should be more closely examined using retrospective longitudinal research designs. Such research may clarify the temporal sequence of health and suicidal behaviors and extend the current study.

Although this study suggests behaviors that potentiate suicide attempt risk, the inability to predict future suicide attempts reliably is one of the major gaps in the suicide literature (e.g., Prinstein et al., 2008). Thus, more research on risk assessment of suicide attempts is needed to further understand and develop better predictive ability for future suicide attempts. To that end, examining predictors of suicide attempts by novel analytic techniques such as classification and regression tree (CART) may yield important information that can be incorporated into screening and risk assessment. Briefly, CART analysis constructs classification trees by partitioning the sample into mutually exclusive binary groups (Mann et al., 2008). In the process, the most salient predictive variables are ranked in order of relative importance and used to split the data into subgroups (Mann et al., 2008). Systematic identification of risk factors by their relative contributions to the outcome aids in the development of risk assessment tools that can be easily interpreted in practice and used for clinical decision-making. Additionally, given that CART identifies the best predictors for each subsample, it allows for a closer examination of unique risk and protective behaviors that predict subgroups. Preliminary CART analyses using the current study data indicated that health behaviors that predict suicidal behaviors in LGB youth are indeed distinct from those found for the full sample. As such, research using a

different analytic technique such as CART might extend the current study findings and illuminate additional targets of prevention and interventions specifically for various subsamples of youth.

Lastly, a small but growing body of literature suggests that research on resiliency and protective factors of suicidal behaviors may yield more effective and insightful results than those solely focused on risk factors of suicidality (e.g., Beautrais, Collings, Ehrhardt, & Henare, 2005; Borowsky et al., 1999; Rutter, 2008). In particular, prevention and interventions focused on areas of personal strength and resilience that LGB and other youth hold might promote protective factors that counterbalance the impact of adversity, thereby potentially reducing the risk for suicide attempts. To that end, research that examines resilience and protective factors of suicidal thoughts and behaviors across multiple domains of influence for adolescents, particularly for LGB youth, may be essential in developing and shaping effective suicide prevention and intervention efforts.

Implications for Practice

The present work has many applied implications for prevention and intervention of suicide ideation and suicidal behaviors in adolescents. Overall, the results suggest that the most important precursor of suicide attempts is the development of suicide ideation. Thus, early prevention and intervention of suicide ideation may be the greatest areas of impact on youth suicide.

As indicated by a review on suicide prevention strategies (Mann et al., 2005), early intervention focused on identifying or screening for depression and suicidal ideation may be key targets for youth suicide prevention. Screening for depression can be conducted by various individuals associated with youth including self, peers, family

members, school staff, family physicians, and other service providers (Mann et al., 2005). Such screening has been shown to have reliability and validity for identifying youth at risk for suicidal behaviors (Mann et al., 2005). Additionally, such screening doubles the number of youth identified as at risk compared to interventions without any screening (Mann et al., 2005). Once adolescents are identified as at risk, these youth could be referred to school counselors/teachers/staff, mental health service providers, and/or other resources for further evaluation and treatment.

Secondary prevention interventions aimed at identifying and reducing risks for the escalation of suicidality also may be critical for preventing suicide attempts. In contrast to prevention efforts that target identification and referrals for suicide ideation, secondary interventions might focus on alleviating the impact of proximal risk factors for suicide attempts. The study findings suggest that once suicidal thoughts develop, management and reduction of disinhibition may be potential targets for preventing suicide attempts. Specifically, if alcohol and/or marijuana use is identified in suicidal adolescents, evaluation and treatment of such substance use may be critical in reducing risk for suicide attempts. To that end, integrated substance use treatment protocols that incorporate assessment and ongoing monitoring of the presence of suicide ideation might be helpful in reducing suicide attempt risk among suicidal adolescents (Esposito-Smythers & Spirito, 2004). Additionally, given that behavioral disinhibition could indicate some deficits in self-regulation and/or lack of effective strategies to manage one's emotion/behavior, psychosocial treatments that target emotional and/or behavioral dysregulation might be effective for reducing suicide attempt risk. To this end, Dialectical Behavior Therapy (Linehan, 1993) adapted for adolescents, which includes

psychoeducation and skills training components designed to improve emotion/behavior regulation and decrease self-destructive behaviors, has been shown to reduce the severity of suicide ideation and self-harm behavior among adolescents (Mehlum et al., 2014).

Further, the present finding that high academic performance may protect against suicide attempts in adolescents suggests that a major drop in grade point average or a trend toward lower academic performance may indicate the development of behavioral, emotional, or interpersonal problems. Patterns in students' grade point averages could be routinely assessed in school, and as appropriate, youth whose academic performance declines could be referred to school counseling or advising services for evaluation. To this end, data on student academic progress and performance could be collected and monitored by teachers and administrators by using a tracking system such as the Longitudinal Data System used by the Hawai'i State Department of Education (2017). Another potential application of the current finding may be that given that academic achievement is positively correlated with other correlates such as attendance (e.g., Gottfried, 2010; Roby, 2004), efforts to increase attendance patterns might be useful for all adolescents. According to the review of youth suicidality literature, poor academic performance has been positively associated with suicide attempts (Evans et al., 2004). To that end, proactive approaches specifically designed to increase attendance patterns such as through attractive curricular and extracurricular programs may be incorporated as appropriate (Roby, 2004).

Importantly, the current findings highlight the importance of attenuating suicide attempt risk for LGB youth with suicide ideation. Given the high rates of transition from suicide ideation to attempts in LGB youth who engage in self-harm, assessment and

intervention of self-harm may be important targets for suicide prevention in LGB youth. Moreover, given that the majority of youth who self-harm do so repeatedly (Laye-Gindhu & Schonert-Reichl, 2005), intervention of self-harm behavior before it becomes chronic is critical in preventing escalation of self-destructive behaviors. One intervention strategy might be to address underlying emotional distress associated with self-harm. Prior research has shown that negative emotional states such as depression, anger, and loneliness precede a self-harming incident (e.g., Laye-Gindhu & Schonert-Reichl, 2005); thus, one strategy for psychosocial treatment might be to address negative affective states and increase coping and regulation of one's affect. Another intervention strategy might be to limit access to self-harm means. According to Liu and Mustanski (2012), limiting opportunities for self-injurious behavior such as increased parental supervision and limiting access to or removing instruments of self-harm may be potentially effective strategies for reducing self-harm. Thus, similar to lethal means restriction found to be effective in reducing rates of suicide and suicide attempts (e.g., Mann et al., 2005; Yip et al., 2012), it might be useful to consider means restriction for youth engaging in self-harming behaviors.

More broadly, an ecological approach to adolescent suicide prevention may be important for reducing suicidal behaviors. For example, in addition to screening for depression and suicide ideation, it may also be important to increase knowledge and public awareness about suicide. In this vein, gatekeeper training aimed to educate and train community members to identify those at risk for suicidal behaviors and to refer these individuals for treatment has been demonstrated as an effective strategy for suicide prevention (Mann et al., 2005). Indeed, youth suicide prevention models such as

Hawai‘i’s Caring Communities Initiative (Chung-Do et al., 2015), which is designed to enhance youth and community awareness of suicide prevention and foster connectedness among youth and community members, has been shown as a promising approach to youth suicide prevention. Given the multicultural and multi-island geographic context of Hawai‘i, culturally sensitive and community-driven approaches for suicide prevention may be particularly critical in reducing stigma associated with mental health issues and raising public awareness regarding youth suicide prevention in Hawai‘i. Additionally, gatekeeper training could reach more broadly to community-based organizations such as youth centers and clubs, faith-based organizations, and youth development programs such as Boy/Girl Scouts and YMCA/YWCA. Such training in organizations and programs that serve and connect youth with adults and community members through a wide range of activities may increase the likelihood that youth with depression and/or suicide ideation may be identified early and referred to appropriate interventions.

Regarding LGB youth, suicide prevention and intervention approaches that address and reduce the impact of victimization experiences might be useful in preventing suicide attempts for LGB adolescents. A recent health report on sexual minority youth and adults released by the Hawai‘i State Department of Health indicates that there are considerable health and social disparities between LGB and heterosexual youth (Holmes et al., 2017). It may be that a more ecological prevention approach that promotes healthy, positive, and safer social and emotional climates in schools and communities might be needed to reduce victimization (Goodenow, Szalacha, & Westheimer, 2006). For example, some efforts suggested to improve and promote healthy school environment for LGB youth include staff training to increase sensitivity and awareness, school

curriculums designed to increase acceptance of diversity and sexual orientation, and policy development against harassment (see Goodenow et al., 2006, for a review). Further, establishment of school-based support groups for youth struggling with issues related to sexual orientation and student-led clubs to support LGB youth and their heterosexual peer allies has been found to reduce prejudice, discrimination, and harassment within schools (e.g., Lipkin, 1999; Perrotti & Westheimer, 2002). More supportive school policies, communication, and programs and activities that foster healthy environments and connectedness could potentially shape the outcome for LGB and all youth.

Appendix A

2013 Hawai‘i High School Youth Risk Behavior Survey

This survey is about health behavior. It has been developed so you can tell us what you do that may affect your health. The information you give will be used to improve health education for young people like yourself.

DO NOT write your name on this survey. The answers you give will be kept private. No one will know what you write. Answer the questions based on what you really do.

Completing the survey is voluntary. Whether or not you answer the questions will not affect your grade in this class. If you are not comfortable answering a question, just leave it blank.

The questions that ask about your background will be used only to describe the types of students completing this survey. The information will not be used to find out your name. No names will ever be reported.

Make sure to read every question. Fill in the ovals completely. When you are finished, follow the instructions of the person giving you the survey.

Thank you very much for your help.

8. Which one of these groups **best** describes you? (Select only **one** response.)
- A. Hispanic or Latino
 - B. Native Hawaiian
 - C. Filipino
 - D. Japanese
 - E. White
 - F. Other Pacific Islander
 - G. Some other race or ethnicity
 - H. I do not describe myself as only one race or ethnicity
9. During the past 12 months, how would you describe your grades in school?
- A. Mostly A's
 - B. Mostly B's
 - C. Mostly C's
 - D. Mostly D's
 - E. Mostly F's
 - F. None of these grades
 - G. Not sure

The next question asks about personal safety.

10. During the past 30 days, on how many days did you **text or e-mail** while **driving** a car or other vehicle?
- A. I did not drive a car or other vehicle during the past 30 days
 - B. 0 days
 - C. 1 or 2 days
 - D. 3 to 5 days
 - E. 6 to 9 days
 - F. 10 to 19 days
 - G. 20 to 29 days
 - H. All 30 days

The next 7 questions ask about violence-related behaviors.

11. During the past 30 days, on how many days did you carry a **weapon** such as a gun, knife, or club?
- A. 0 days
 - B. 1 day
 - C. 2 or 3 days
 - D. 4 or 5 days
 - E. 6 or more days

12. During the past 30 days, on how many days did you **not** go to school because you felt you would be unsafe at school or on your way to or from school?
- A. 0 days
 - B. 1 day
 - C. 2 or 3 days
 - D. 4 or 5 days
 - E. 6 or more days

13. During the past 12 months, how many times were you in a physical fight?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or 7 times
 - F. 8 or 9 times
 - G. 10 or 11 times
 - H. 12 or more times

14. During the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor or nurse?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or more times

15. Have you ever been physically forced to have sexual intercourse when you did not want to?
- A. Yes
 - B. No

16. During the past 12 months, how many times did someone you were dating or going out with physically hurt you on purpose? (Count such things as being hit, slammed into something, or injured with an object or weapon.)
- A. I did not date or go out with anyone during the past 12 months
 - B. 0 times
 - C. 1 time
 - D. 2 or 3 times
 - E. 4 or 5 times
 - F. 6 or more times

17. During the past 12 months, how many times did someone you were dating or going out with force you to do sexual things that you did not want to do? (Count such things as kissing, touching, or being physically forced to have sexual intercourse.)
- A. I did not date or go out with anyone during the past 12 months
 - B. 0 times
 - C. 1 time
 - D. 2 or 3 times
 - E. 4 or 5 times
 - F. 6 or more times

The next 3 questions ask about bullying. Bullying is when 1 or more students tease, threaten, spread rumors about, hit, shove, or hurt another student over and over again. It is not bullying when 2 students of about the same strength or power argue or fight or tease each other in a friendly way.

18. During the past 12 months, have you ever been bullied **on school property**?
- A. Yes
 - B. No
19. During the past 12 months, have you ever been **electronically** bullied? (Count being bullied through e-mail, chat rooms, instant messaging, websites, or texting.)
- A. Yes
 - B. No
20. During the past 12 months, have you ever bullied someone else **electronically**? (Count bullying through e-mail, chat rooms, instant messaging, websites, online gaming, or texting.)
- A. Yes
 - B. No

The next question asks about hurting yourself on purpose.

21. During the past 12 months, how many times did you do something to purposely hurt yourself without wanting to die, such as cutting or burning yourself on purpose?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or more times

The next 5 questions ask about sad feelings and attempted suicide. Sometimes people feel so depressed about the future that they may consider attempting suicide, that is, taking some action to end their own life.

22. During the past 12 months, did you ever feel so sad or hopeless almost every day for **two weeks or more in a row** that you stopped doing some usual activities?
- A. Yes
 - B. No
23. During the past 12 months, did you ever **seriously** consider attempting suicide?
- A. Yes
 - B. No
24. During the past 12 months, did you make a plan about how you would attempt suicide?
- A. Yes
 - B. No
25. During the past 12 months, how many times did you actually attempt suicide?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or more times

26. **If you attempted suicide** during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?
- A. **I did not attempt suicide** during the past 12 months
 - B. Yes
 - C. No

The next 2 questions ask about tobacco use.

27. How old were you when you smoked a whole cigarette for the first time?
- A. I have never smoked a whole cigarette
 - B. 8 years old or younger
 - C. 9 or 10 years old
 - D. 11 or 12 years old
 - E. 13 or 14 years old
 - F. 15 or 16 years old
 - G. 17 years old or older
28. During the past 30 days, on how many days did you smoke cigarettes?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

The next 8 questions ask about drinking alcohol. This includes drinking beer, wine, wine coolers, and liquor such as rum, gin, vodka, or whiskey. For these questions, drinking alcohol does not include drinking a few sips of wine for religious purposes.

29. How old were you when you had your first drink of alcohol other than a few sips?
- A. I have never had a drink of alcohol other than a few sips
 - B. 8 years old or younger
 - C. 9 or 10 years old
 - D. 11 or 12 years old
 - E. 13 or 14 years old
 - F. 15 or 16 years old
 - G. 17 years old or older

30. During the past 30 days, on how many days did you have at least one drink of alcohol?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

31. During the past 30 days, on how many days did you have at least one drink of alcohol **on school property**?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

32. During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 to 5 days
 - E. 6 to 9 days
 - F. 10 to 19 days
 - G. 20 or more days

33. During the past 30 days, what is the largest number of alcoholic drinks you had in a row, that is, within a couple of hours?
- A. I did not drink alcohol during the past 30 days
 - B. 1 or 2 drinks
 - C. 3 drinks
 - D. 4 drinks
 - E. 5 drinks
 - F. 6 or 7 drinks
 - G. 8 or 9 drinks
 - H. 10 or more drinks

34. During the past 30 days, how did you **usually** get the alcohol you drank?
- A. I did not drink alcohol during the past 30 days
 - B. I bought it in a store such as a liquor store, convenience store, supermarket, discount store, or gas station
 - C. I bought it at a restaurant, bar, or club
 - D. I bought it at a public event such as a concert or sporting event
 - E. I gave someone else money to buy it for me
 - F. Someone gave it to me
 - G. I took it from a store or family member
 - H. I got it some other way
35. During the past 12 months, how many of your 4 best friends have tried beer, wine, or hard liquor (such as rum, gin, vodka, or whiskey) when their parents did not know about it?
- A. 0
 - B. 1
 - C. 2
 - D. 3
 - E. 4
 - F. Not sure
36. How wrong do your parents feel it would be for you to drink beer, wine, or hard liquor (such as rum, gin, vodka, or whiskey) regularly?
- A. Very wrong
 - B. Wrong
 - C. A little bit wrong
 - D. Not at all wrong
 - E. Not sure

The next 3 questions ask about marijuana use. Marijuana also is called grass, pot, or *pakalōlō*.

37. How old were you when you tried marijuana for the first time?
- A. I have never tried marijuana
 - B. 8 years old or younger
 - C. 9 or 10 years old
 - D. 11 or 12 years old
 - E. 13 or 14 years old
 - F. 15 or 16 years old
 - G. 17 years old or older

38. During the past 30 days, how many times did you use marijuana?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
39. During the past 30 days, how many times did you use marijuana **on school property**?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times

The next 9 questions ask about other drugs.

40. During your life, how many times have you used **any** form of cocaine, including powder, crack, or freebase?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
41. During your life, how many times have you sniffed glue, breathed the contents of aerosol spray cans, or inhaled any paints or sprays to get high?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
42. During your life, how many times have you used **heroin** (also called smack, junk, or China White)?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times

43. During your life, how many times have you used **methamphetamines** (also called speed, crystal, crank, or ice)?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

44. During your life, how many times have you used **ecstasy** (also called MDMA)?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

45. During your life, how many times have you used **hallucinogenic drugs**, such as LSD, acid, PCP, angel dust, mescaline, or mushrooms?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

46. During your life, how many times have you taken a **prescription drug** (such as OxyContin, Percocet, Vicodin, codeine, Adderall, Ritalin, or Xanax) without a doctor's prescription?

- A. 0 times
- B. 1 or 2 times
- C. 3 to 9 times
- D. 10 to 19 times
- E. 20 to 39 times
- F. 40 or more times

47. During your life, how many times have you used a needle to inject any **illegal** drug into your body?

- A. 0 times
- B. 1 time
- C. 2 or more times

48. During the past 12 months, has anyone offered, sold, or given you an illegal drug **on school property**?

- A. Yes
- B. No

The next 9 questions ask about alcohol and drugs.

49. During the past 30 days, have you ridden in a car driven by someone, including yourself, who was "high" or had been using alcohol or drugs?

- A. Yes
- B. No

50. Do you ever use alcohol or drugs to relax, feel better about yourself, or fit in?

- A. Yes
- B. No

51. Do you ever use alcohol or drugs while you are alone?

- A. Yes
- B. No

52. Do you ever forget things you did while using alcohol or drugs?

- A. Yes
- B. No

53. Do your family or friends ever tell you that you should cut down on your drinking or drug use?

- A. Yes
- B. No

54. Have you ever gotten into trouble while you were using alcohol or drugs?

- A. Yes
- B. No

55. If you thought that your alcohol or drug use was causing you problems, would you seek help from a counselor or doctor?

- A. Yes
- B. No

56. How many adults do you know who got drunk or high during the past 12 months?
- A. 0 adults
 - B. 1 adult
 - C. 2 adults
 - D. 3 adults
 - E. 4 adults
 - F. 5 or more adults

57. During the past 12 months, have you attended school under the influence of alcohol or other illegal drugs, such as marijuana or cocaine?
- A. Yes
 - B. No

The next 9 questions ask about sexual behavior.

58. Have you ever had sexual intercourse?
- A. Yes
 - B. No

59. How old were you when you had sexual intercourse for the first time?
- A. I have never had sexual intercourse
 - B. 11 years old or younger
 - C. 12 years old
 - D. 13 years old
 - E. 14 years old
 - F. 15 years old
 - G. 16 years old
 - H. 17 years old or older

60. During your life, with how many people have you had sexual intercourse?
- A. I have never had sexual intercourse
 - B. 1 person
 - C. 2 people
 - D. 3 people
 - E. 4 people
 - F. 5 people
 - G. 6 or more people

61. During the past 3 months, with how many people did you have sexual intercourse?
- A. I have never had sexual intercourse
 - B. I have had sexual intercourse, but not during the past 3 months
 - C. 1 person
 - D. 2 people
 - E. 3 people
 - F. 4 people
 - G. 5 people
 - H. 6 or more people

62. Did you drink alcohol or use drugs before you had sexual intercourse the **last time**?
- A. I have never had sexual intercourse
 - B. Yes
 - C. No

63. The **last time** you had sexual intercourse, did you or your partner use a condom?
- A. I have never had sexual intercourse
 - B. Yes
 - C. No

64. The **last time** you had sexual intercourse, what **one** method did you or your partner use to **prevent pregnancy**? (Select only **one** response.)
- A. I have never had sexual intercourse
 - B. No method was used to prevent pregnancy
 - C. Birth control pills
 - D. Condoms
 - E. An IUD (such as Mirena or ParaGard) or implant (such as Implanon or Nexplanon)
 - F. A shot (such as Depo-Provera), patch (such as Ortho Evra), or birth control ring (such as NuvaRing)
 - G. Withdrawal or some other method
 - H. Not sure

65. During your life, with whom have you had sexual contact?
- A. I have never had sexual contact
 - B. Females
 - C. Males
 - D. Females and males

66. Which of the following best describes you?
- A. Heterosexual (straight)
 - B. Gay or lesbian
 - C. Bisexual
 - D. Not sure

The next 4 questions ask about body weight.

67. How do **you** describe your weight?
- A. Very underweight
 - B. Slightly underweight
 - C. About the right weight
 - D. Slightly overweight
 - E. Very overweight
68. During the past 30 days, did you **go without eating for 24 hours or more** (also called fasting) to lose weight or to keep from gaining weight?
- A. Yes
 - B. No
69. During the past 30 days, did you **take any diet pills, powders, or liquids** without a doctor's advice to lose weight or to keep from gaining weight? (Do **not** count meal replacement products such as Slim Fast.)
- A. Yes
 - B. No
70. During the past 30 days, did you **vomit or take laxatives** to lose weight or to keep from gaining weight?
- A. Yes
 - B. No

The next 9 questions ask about food you ate or drank during the past 7 days. Think about all the meals and snacks you had from the time you got up until you went to bed. Be sure to include food you ate at home, at school, at restaurants, or anywhere else.

71. During the past 7 days, how many times did you drink **100% fruit juices** such as orange juice, apple juice, or grape juice? (Do **not** count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.)
- A. I did not drink 100% fruit juice during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
72. During the past 7 days, how many times did you eat **fruit**? (Do **not** count fruit juice.)
- A. I did not eat fruit during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
73. During the past 7 days, how many times did you eat cooked or canned beans, such as refried beans, baked beans, black or garbanzo beans, beans in soup, soybeans, edamame, tofu, or lentils? (Do **not** count long beans or green beans.)
- A. I did not eat beans during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day

74. During the past 7 days, how many times did you eat **dark green vegetables** such as broccoli, romaine, chard, collard greens, watercress, kale, or spinach?
- A. I did not eat dark green vegetables during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
75. During the past 7 days, how many times did you eat **orange-colored vegetables** such as sweet potatoes, pumpkin, winter squash, or carrots?
- A. I did not eat orange-colored vegetables during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
76. During the past 7 days, how many times did you eat **other vegetables** such as tomatoes (including tomato juice or V8 juice), corn, eggplant, peas, green beans, lettuce, cabbage, and baked or mashed potatoes? (Do **not** count french fries or other fried potatoes.)
- A. I did not eat other vegetables during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
77. During the past 7 days, how many times did you drink a **can, bottle, or glass of soda or pop**, such as Coke, Pepsi, or Sprite? (Do **not** count diet soda or diet pop.)
- A. I did not drink soda or pop during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
78. During the past 7 days, how many **glasses of milk** did you drink? (Count the milk you drank in a glass or cup, from a carton, or with cereal. Count the half pint of milk served at school as equal to one glass.)
- A. I did not drink milk during the past 7 days
 - B. 1 to 3 glasses during the past 7 days
 - C. 4 to 6 glasses during the past 7 days
 - D. 1 glass per day
 - E. 2 glasses per day
 - F. 3 glasses per day
 - G. 4 or more glasses per day
79. During the past 7 days, on how many days did you eat **breakfast**?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
 - G. 6 days
 - H. 7 days

The next 6 questions ask about physical activity.

80. During the past 7 days, on how many days were you physically active for a total of **at least 60 minutes per day**? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
 - G. 6 days
 - H. 7 days
81. On how many of the past 7 days did you do exercises to **strengthen or tone your muscles**, such as push-ups, sit-ups, or weight lifting?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
 - G. 6 days
 - H. 7 days
82. On an average school day, how many hours do you watch TV?
- A. I do not watch TV on an average school day
 - B. Less than 1 hour per day
 - C. 1 hour per day
 - D. 2 hours per day
 - E. 3 hours per day
 - F. 4 hours per day
 - G. 5 or more hours per day

83. On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Count time spent on things such as Xbox, PlayStation, an iPod, an iPad or other tablet, a smartphone, YouTube, Facebook or other social networking tools, and the Internet.)
- A. I do not play video or computer games or use a computer for something that is not school work
 - B. Less than 1 hour per day
 - C. 1 hour per day
 - D. 2 hours per day
 - E. 3 hours per day
 - F. 4 hours per day
 - G. 5 or more hours per day
84. In an average week when you are in school, on how many days do you go to physical education (PE) classes?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
85. During the past 12 months, on how many sports teams did you play? (Count any teams run by your school or community groups.)
- A. 0 teams
 - B. 1 team
 - C. 2 teams
 - D. 3 or more teams

The next 14 questions ask about other health-related topics.

86. Have you ever been taught about AIDS or HIV infection in school?
- A. Yes
 - B. No
 - C. Not sure

87. Have you ever been tested for HIV, the virus that causes AIDS? (Do **not** count tests done if you donated blood.)
- A. Yes
 - B. No
 - C. Not sure
88. Has a doctor or nurse ever told you that you have asthma?
- A. Yes
 - B. No
 - C. Not sure
89. Do you still have asthma?
- A. I have never had asthma
 - B. Yes
 - C. No
 - D. Not sure
90. When was the last time you saw a doctor or nurse for a check-up or physical exam when you were not sick or injured?
- A. During the past 12 months
 - B. Between 12 and 24 months ago
 - C. More than 24 months ago
 - D. Never
 - E. Not sure
91. When was the last time you saw a dentist for a check-up, exam, teeth cleaning, or other dental work?
- A. During the past 12 months
 - B. Between 12 and 24 months ago
 - C. More than 24 months ago
 - D. Never
 - E. Not sure
92. During the past 12 months, did you have a toothache?
- A. Yes
 - B. No
 - C. Not sure
93. On an average school night, how many hours of sleep do you get?
- A. 4 or less hours
 - B. 5 hours
 - C. 6 hours
 - D. 7 hours
 - E. 8 hours
 - F. 9 hours
 - G. 10 or more hours
94. Is there at least one teacher or other adult in this school that you can talk to if you have a problem?
- A. Yes
 - B. No
 - C. Not sure
95. Outside of school, is there an adult you can talk to about things that are important to you?
- A. Yes
 - B. No
 - C. Not sure
96. During the past 12 months, have you talked with at least one of your parents or another adult in your family about the dangers of tobacco, alcohol, or drug use?
- A. Yes
 - B. No
 - C. Not sure
97. Do you agree or disagree that you can resist peer pressure and dangerous situations?
- A. Strongly agree
 - B. Agree
 - C. Not sure
 - D. Disagree
 - E. Strongly disagree

98. How likely is it that you will complete a post high school program such as a vocational training program, military service, community college, or 4-year college?
- A. Definitely will not
 - B. Probably will not
 - C. Probably will
 - D. Definitely will
 - E. Not sure

99. When you are outside for more than one hour on a sunny day, how often do you wear sunscreen with an SPF of 15 or higher?
- A. Never
 - B. Rarely
 - C. Sometimes
 - D. Most of the time
 - E. Always

**This is the end of the survey.
Thank you very much for your help.**

Appendix B

2015 Hawai‘i High School Youth Risk Behavior Survey

This survey is about health behavior. It has been developed so you can tell us what you do that may affect your health. The information you give will be used to improve health education for young people like yourself.

DO NOT write your name on this survey. The answers you give will be kept private. No one will know what you write. Answer the questions based on what you really do.

Completing the survey is voluntary. Whether or not you answer the questions will not affect your grade in this class. If you are not comfortable answering a question, just leave it blank.

The questions that ask about your background will be used only to describe the types of students completing this survey. The information will not be used to find out your name. No names will ever be reported.

Make sure to read every question. Fill in the ovals completely. When you are finished, follow the instructions of the person giving you the survey.

Thank you very much for your help.

Directions

- Use a #2 pencil only.
- Make dark marks.
- Fill in a response like this: A B ● D.
- If you change your answer, erase your old answer completely.

- How old are you?
 - 12 years old or younger
 - 13 years old
 - 14 years old
 - 15 years old
 - 16 years old
 - 17 years old
 - 18 years old or older
- What is your sex?
 - Female
 - Male
- In what grade are you?
 - 9th grade
 - 10th grade
 - 11th grade
 - 12th grade
 - Ungraded or other grade
- Are you Hispanic or Latino?
 - Yes
 - No
- What is your race? (Select one or more responses.)
 - American Indian or Alaska Native
 - Black or African American
 - Filipino
 - Japanese
 - Native Hawaiian/Part Hawaiian
 - Other Asian
 - Other Pacific Islander
 - White

- How tall are you without your shoes on?
 Directions: Write your height in the shaded blank boxes.
 Fill in the matching oval below each number.

Example

Height	
Feet	Inches
5	7
③	⑩
④	①
●	②
⑥	③
⑦	④
	⑤
	⑥
	●
	⑧
	⑨
	⑩
	⑪

- How much do you weigh without your shoes on?
 Directions: Write your weight in the shaded blank boxes.
 Fill in the matching oval below each number.

Example

Weight		
Pounds		
1	5	2
①	①	①
●	①	①
②	②	●
③	③	③
	④	④
	●	⑤
	⑥	⑥
	⑦	⑦
	⑧	⑧
	⑨	⑨

8. Which one of these groups **best** describes you?
(Select only **one** response.)
- A. Hispanic or Latino
 - B. Native Hawaiian
 - C. Filipino
 - D. Japanese
 - E. White
 - F. Other Pacific Islander
 - G. Some other race or ethnicity
 - H. I do not describe myself as only one race or ethnicity
9. During the past 12 months, how would you describe your grades in school?
- A. Mostly A's
 - B. Mostly B's
 - C. Mostly C's
 - D. Mostly D's
 - E. Mostly F's
 - F. None of these grades
 - G. Not sure

The next question asks about personal safety.

10. During the past 30 days, on how many days did you **text or e-mail** while **driving** a car or other vehicle?
- A. I did not drive a car or other vehicle during the past 30 days
 - B. 0 days
 - C. 1 or 2 days
 - D. 3 to 5 days
 - E. 6 to 9 days
 - F. 10 to 19 days
 - G. 20 to 29 days
 - H. All 30 days

The next 8 questions ask about violence-related behaviors.

11. During the past 30 days, on how many days did you carry a **weapon** such as a gun, knife, or club?
- A. 0 days
 - B. 1 day
 - C. 2 or 3 days
 - D. 4 or 5 days
 - E. 6 or more days

12. During the past 30 days, on how many days did you **not** go to school because you felt you would be unsafe at school or on your way to or from school?
- A. 0 days
 - B. 1 day
 - C. 2 or 3 days
 - D. 4 or 5 days
 - E. 6 or more days
13. During the past 12 months, how many times were you in a physical fight?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or 7 times
 - F. 8 or 9 times
 - G. 10 or 11 times
 - H. 12 or more times
14. During the past 12 months, how many times were you in a physical fight in which you were injured and had to be treated by a doctor or nurse?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or more times
15. Have you ever been physically forced to have sexual intercourse when you did not want to?
- A. Yes
 - B. No
16. During the past 12 months, how many times did someone you were dating or going out with purposely try to control you or emotionally hurt you? (Count such things as being told who you could and could not spend time with, being humiliated in front of others, or being threatened if you did not do what they wanted.)
- A. I did not date or go out with anyone during the past 12 months
 - B. 0 times
 - C. 1 time
 - D. 2 or 3 times
 - E. 4 or 5 times
 - F. 6 or more times

17. During the past 12 months, how many times did someone you were dating or going out with physically hurt you on purpose? (Count such things as being hit, slammed into something, or injured with an object or weapon.)
A. I did not date or go out with anyone during the past 12 months
B. 0 times
C. 1 time
D. 2 or 3 times
E. 4 or 5 times
F. 6 or more times
18. During the past 12 months, how many times did someone you were dating or going out with force you to do sexual things that you did not want to do? (Count such things as kissing, touching, or being physically forced to have sexual intercourse.)
A. I did not date or go out with anyone during the past 12 months
B. 0 times
C. 1 time
D. 2 or 3 times
E. 4 or 5 times
F. 6 or more times

The next 3 questions ask about bullying. Bullying is when 1 or more students tease, threaten, spread rumors about, hit, shove, or hurt another student over and over again. It is not bullying when 2 students of about the same strength or power argue or fight or tease each other in a friendly way.

19. During the past 12 months, have you ever been bullied **on school property**?
A. Yes
B. No
20. During the past 12 months, have you ever been **electronically** bullied? (Count being bullied through e-mail, chat rooms, instant messaging, websites, or texting.)
A. Yes
B. No

21. During the past 12 months, have you ever **electronically** bullied someone? (Count bullying through e-mail, chat rooms, instant messaging, websites, online gaming, or texting.)
A. Yes
B. No

The next question asks about hurting yourself on purpose.

22. During the past 12 months, how many times did you do something to purposely hurt yourself without wanting to die, such as cutting or burning yourself on purpose?
A. 0 times
B. 1 time
C. 2 or 3 times
D. 4 or 5 times
E. 6 or more times

The next 5 questions ask about sad feelings and attempted suicide. Sometimes people feel so depressed about the future that they may consider attempting suicide, that is, taking some action to end their own life.

23. During the past 12 months, did you ever feel so sad or hopeless almost every day for **two weeks or more in a row** that you stopped doing some usual activities?
A. Yes
B. No
24. During the past 12 months, did you ever **seriously** consider attempting suicide?
A. Yes
B. No
25. During the past 12 months, did you make a plan about how you would attempt suicide?
A. Yes
B. No

26. During the past 12 months, how many times did you actually attempt suicide?
- A. 0 times
 - B. 1 time
 - C. 2 or 3 times
 - D. 4 or 5 times
 - E. 6 or more times
27. **If you attempted suicide** during the past 12 months, did any attempt result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse?
- A. **I did not attempt suicide** during the past 12 months
 - B. Yes
 - C. No

The next 3 questions ask about tobacco use.

28. Have you ever tried cigarette smoking, even one or two puffs?
- A. Yes
 - B. No
29. How old were you when you smoked a whole cigarette for the first time?
- A. I have never smoked a whole cigarette
 - B. 8 years old or younger
 - C. 9 or 10 years old
 - D. 11 or 12 years old
 - E. 13 or 14 years old
 - F. 15 or 16 years old
 - G. 17 years old or older
30. During the past 30 days, on how many days did you smoke cigarettes?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

The next 2 questions ask about electronic vapor products, such as blu, NJOY, or Starbuzz. Electronic vapor products include e-cigarettes, e-cigars, e-pipes, vape pipes, vaping pens, e-hookahs, and hookah pens.

31. Have you ever used an electronic vapor product?
- A. Yes
 - B. No
32. During the past 30 days, on how many days did you use an electronic vapor product?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

The next 5 questions ask about drinking alcohol. This includes drinking beer, wine, wine coolers, and liquor such as rum, gin, vodka, or whiskey. For these questions, drinking alcohol does not include drinking a few sips of wine for religious purposes.

33. How old were you when you had your first drink of alcohol other than a few sips?
- A. I have never had a drink of alcohol other than a few sips
 - B. 8 years old or younger
 - C. 9 or 10 years old
 - D. 11 or 12 years old
 - E. 13 or 14 years old
 - F. 15 or 16 years old
 - G. 17 years old or older
34. During the past 30 days, on how many days did you have at least one drink of alcohol?
- A. 0 days
 - B. 1 or 2 days
 - C. 3 to 5 days
 - D. 6 to 9 days
 - E. 10 to 19 days
 - F. 20 to 29 days
 - G. All 30 days

35. During the past 30 days, on how many days did you have 5 or more drinks of alcohol in a row, that is, within a couple of hours?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 to 5 days
 - E. 6 to 9 days
 - F. 10 to 19 days
 - G. 20 or more days
36. During the past 30 days, what is the largest number of alcoholic drinks you had in a row, that is, within a couple of hours?
- A. I did not drink alcohol during the past 30 days
 - B. 1 or 2 drinks
 - C. 3 drinks
 - D. 4 drinks
 - E. 5 drinks
 - F. 6 or 7 drinks
 - G. 8 or 9 drinks
 - H. 10 or more drinks
37. How wrong do your parents feel it would be for you to drink beer, wine, or hard liquor (such as rum, gin, vodka, or whiskey) regularly?
- A. Very wrong
 - B. Wrong
 - C. A little bit wrong
 - D. Not at all wrong
 - E. Not sure

The next 3 questions ask about marijuana use. Marijuana also is called grass, pot, or pakalōlō.

38. How old were you when you tried marijuana for the first time?
- A. I have never tried marijuana
 - B. 8 years old or younger
 - C. 9 or 10 years old
 - D. 11 or 12 years old
 - E. 13 or 14 years old
 - F. 15 or 16 years old
 - G. 17 years old or older

39. During the past 30 days, how many times did you use marijuana?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
40. During the past 30 days, how did you **usually** use marijuana?
- A. I did not use marijuana during the past 30 days
 - B. I smoked it in a joint, bong, pipe, or blunt
 - C. I ate it in food such as brownies, cakes, cookies, or candy
 - D. I drank it in tea, cola, alcohol, or other drinks
 - E. I vaporized it
 - F. I used it some other way

The next 10 questions ask about other drugs.

41. During your life, how many times have you used **any** form of cocaine, including powder, crack, or freebase?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
42. During your life, how many times have you sniffed glue, breathed the contents of aerosol spray cans, or inhaled any paints or sprays to get high?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times

43. During your life, how many times have you used **heroin** (also called smack, junk, or China White)?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
44. During your life, how many times have you used **methamphetamines** (also called speed, crystal, crank, or ice)?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
45. During your life, how many times have you used **ecstasy** (also called MDMA)?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
46. During your life, how many times have you used **synthetic marijuana** (also called K2, Spice, fake weed, King Kong, Yucatan Fire, Skunk, or Moon Rocks)?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
47. During your life, how many times have you taken a **prescription drug** (such as OxyContin, Percocet, Vicodin, codeine, Adderall, Ritalin, or Xanax) without a doctor's prescription?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times

48. During your life, how many times have you used a needle to inject any **illegal** drug into your body?
- A. 0 times
 - B. 1 time
 - C. 2 or more times
49. During your life, how many times have you used **hallucinogenic drugs**, such as LSD, acid, PCP, angel dust, mescaline, or mushrooms?
- A. 0 times
 - B. 1 or 2 times
 - C. 3 to 9 times
 - D. 10 to 19 times
 - E. 20 to 39 times
 - F. 40 or more times
50. During the past 12 months, has anyone offered, sold, or given you an illegal drug **on school property**?
- A. Yes
 - B. No

The next 7 questions ask about alcohol and drugs.

51. During the past 30 days, have you ridden in a car driven by someone, including yourself, who was "high" or had been using alcohol or drugs?
- A. Yes
 - B. No
52. Do you ever use alcohol or drugs to relax, feel better about yourself, or fit in?
- A. Yes
 - B. No
53. Do you ever use alcohol or drugs while you are alone?
- A. Yes
 - B. No
54. Do you ever forget things you did while using alcohol or drugs?
- A. Yes
 - B. No

55. Do your family or friends ever tell you that you should cut down on your drinking or drug use?
A. Yes
B. No
56. Have you ever gotten into trouble while you were using alcohol or drugs?
A. Yes
B. No
57. During the past 12 months, have you attended school under the influence of alcohol, marijuana, or other drugs?
A. Yes
B. No

The next 8 questions ask about sexual behavior.

58. How old were you when you had sexual intercourse for the first time?
A. I have never had sexual intercourse
B. 11 years old or younger
C. 12 years old
D. 13 years old
E. 14 years old
F. 15 years old
G. 16 years old
H. 17 years old or older
59. During your life, with how many people have you had sexual intercourse?
A. I have never had sexual intercourse
B. 1 person
C. 2 people
D. 3 people
E. 4 people
F. 5 people
G. 6 or more people
60. During the past 3 months, with how many people did you have sexual intercourse?
A. I have never had sexual intercourse
B. I have had sexual intercourse, but not during the past 3 months
C. 1 person
D. 2 people
E. 3 people
F. 4 people
G. 5 people
H. 6 or more people

61. Did you drink alcohol or use drugs before you had sexual intercourse the **last time**?
A. I have never had sexual intercourse
B. Yes
C. No
62. The **last time** you had sexual intercourse, did you or your partner use a condom?
A. I have never had sexual intercourse
B. Yes
C. No
63. The **last time** you had sexual intercourse, what **one** method did you or your partner use to **prevent pregnancy**? (Select only **one** response.)
A. I have never had sexual intercourse
B. No method was used to prevent pregnancy
C. Birth control pills
D. Condoms
E. An IUD (such as Mirena or ParaGard) or implant (such as Implanon or Nexplanon)
F. A shot (such as Depo-Provera), patch (such as Ortho Evra), or birth control ring (such as NuvaRing)
G. Withdrawal or some other method
H. Not sure
64. During your life, with whom have you had sexual contact?
A. I have never had sexual contact
B. Females
C. Males
D. Females and males
65. Which of the following best describes you?
A. Heterosexual (straight)
B. Gay or lesbian
C. Bisexual
D. Not sure

The next question asks about body weight.

66. How do **you** describe your weight?
A. Very underweight
B. Slightly underweight
C. About the right weight
D. Slightly overweight
E. Very overweight

The next 12 questions ask about food you ate or drank during the past 7 days. Think about all the meals and snacks you had from the time you got up until you went to bed. Be sure to include food you ate at home, at school, at restaurants, or anywhere else.

67. During the past 7 days, how many times did you drink **100% fruit juices** such as orange juice, apple juice, or grape juice? (Do **not** count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.)
- A. I did not drink 100% fruit juice during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
68. During the past 7 days, how many times did you eat **fruit**? (Do **not** count fruit juice.)
- A. I did not eat fruit during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
69. During the past 7 days, how many times did you eat cooked or canned beans, such as refried beans, baked beans, black or garbanzo beans, beans in soup, soybeans, edamame, tofu, or lentils? (Do **not** count long beans or green beans.)
- A. I did not eat beans during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
70. During the past 7 days, how many times did you eat **dark green vegetables** such as broccoli, romaine lettuce, chard, collard greens, lu'au leaves, watercress, kale, or spinach?
- A. I did not eat dark green vegetables during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
71. During the past 7 days, how many times did you eat **orange-colored vegetables** such as carrots, sweet potatoes, pumpkin, kabocha, or winter squash?
- A. I did not eat orange-colored vegetables during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
72. During the past 7 days, how many times did you eat **other vegetables** such as tomatoes (including tomato juice or V8 juice), corn, eggplant, peas, green beans, lettuce, cabbage, and baked or mashed potatoes? (Do **not** count french fries, potato chips, or other fried potatoes.)
- A. I did not eat other vegetables during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day

73. During the past 7 days, how many times did you drink a **can, bottle, or glass of soda or pop**, such as Coke, Pepsi, or Sprite? (Do **not** count diet soda or diet pop.)
- A. I did not drink soda or pop during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
74. During the past 7 days, how many times did you drink a **can, bottle, pouch, or glass of a juice drink**, such as fruit punch, Hawaiian Sun, Aloha Maid, Sunny Delight, or Tang? (Do **not** count 100% fruit juice.)
- A. I did not drink juice drinks during the past 7 days
 - B. 1 to 3 times during the past 7 days
 - C. 4 to 6 times during the past 7 days
 - D. 1 time per day
 - E. 2 times per day
 - F. 3 times per day
 - G. 4 or more times per day
75. During the past 7 days, how many **glasses of milk** did you drink? (Count the milk you drank in a glass or cup, from a carton, or with cereal. Count the half pint of milk served at school as equal to one glass.)
- A. I did not drink milk during the past 7 days
 - B. 1 to 3 glasses during the past 7 days
 - C. 4 to 6 glasses during the past 7 days
 - D. 1 glass per day
 - E. 2 glasses per day
 - F. 3 glasses per day
 - G. 4 or more glasses per day
76. During the past 7 days, on how many days did you eat **breakfast**?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
 - G. 6 days
 - H. 7 days

77. During the past 30 days, how often did you go hungry because there was not enough food in your home?
- A. Never
 - B. Rarely
 - C. Sometimes
 - D. Most of the time
 - E. Always
78. Are there any foods that you have to avoid because eating the food could cause an allergic reaction, like skin rashes, swelling, itching, vomiting, coughing, or trouble breathing?
- A. Yes
 - B. No
 - C. Not sure

The next 7 questions ask about physical activity.

79. During the past 7 days, on how many days were you physically active for a total of **at least 60 minutes per day**? (Add up all the time you spent in any kind of physical activity that increased your heart rate and made you breathe hard some of the time.)
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
 - G. 6 days
 - H. 7 days
80. During the past 7 days, on how many days did you do exercises to **strengthen or tone your muscles**, such as push-ups, sit-ups, or weight lifting?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
 - G. 6 days
 - H. 7 days

81. On an average school day, how many hours do you watch TV?
- A. I do not watch TV on an average school day
 - B. Less than 1 hour per day
 - C. 1 hour per day
 - D. 2 hours per day
 - E. 3 hours per day
 - F. 4 hours per day
 - G. 5 or more hours per day
82. On an average school day, how many hours do you play video or computer games or use a computer for something that is not school work? (Count time spent on things such as Xbox, PlayStation, an iPod, an iPad or other tablet, a smartphone, YouTube, Facebook or other social networking tools, and the Internet.)
- A. I do not play video or computer games or use a computer for something that is not school work
 - B. Less than 1 hour per day
 - C. 1 hour per day
 - D. 2 hours per day
 - E. 3 hours per day
 - F. 4 hours per day
 - G. 5 or more hours per day
83. In an average week when you are in school, on how many days do you go to physical education (PE) classes?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days
84. In an average week when you are in school, on how many days do you walk or ride your bike **to or from school** when weather allows you to do so?
- A. 0 days
 - B. 1 day
 - C. 2 days
 - D. 3 days
 - E. 4 days
 - F. 5 days

85. During the past 12 months, on how many sports teams did you play? (Count any teams run by your school or community groups.)
- A. 0 teams
 - B. 1 team
 - C. 2 teams
 - D. 3 or more teams

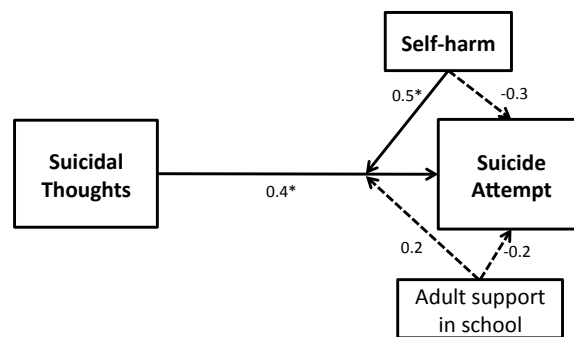
The next 14 questions ask about other health-related topics.

86. Have you ever been taught about AIDS or HIV infection in school?
- A. Yes
 - B. No
 - C. Not sure
87. When was the last time you saw a doctor or nurse for a check-up or physical exam when you were not sick or injured?
- A. During the past 12 months
 - B. Between 12 and 24 months ago
 - C. More than 24 months ago
 - D. Never
 - E. Not sure
88. Has a doctor or nurse ever told you that you have asthma?
- A. Yes
 - B. No
 - C. Not sure
89. Do you still have asthma?
- A. I have never had asthma
 - B. Yes
 - C. No
 - D. Not sure
90. When was the last time you saw a dentist for a check-up, exam, teeth cleaning, or other dental work?
- A. During the past 12 months
 - B. Between 12 and 24 months ago
 - C. More than 24 months ago
 - D. Never
 - E. Not sure

- | | |
|--|--|
| <p>91. During the past 12 months, did you have a toothache?</p> <p>A. Yes
B. No
C. Not sure</p> <p>92. On an average school night, how many hours of sleep do you get?</p> <p>A. 4 or less hours
B. 5 hours
C. 6 hours
D. 7 hours
E. 8 hours
F. 9 hours
G. 10 or more hours</p> <p>93. Is there at least one teacher or other adult in your school that you can talk to if you have a problem?</p> <p>A. Yes
B. No
C. Not sure</p> <p>94. Outside of school, is there an adult you can talk to about things that are important to you?</p> <p>A. Yes
B. No
C. Not sure</p> <p>95. During the past 12 months, have you talked with at least one of your parents or another adult in your family about the dangers of tobacco, alcohol, or drug use?</p> <p>A. Yes
B. No
C. Not sure</p> | <p>96. Have your parents or other adults in your family ever talked with you about what they expect you to do or not to do when it comes to sex?</p> <p>A. Yes
B. No
C. Not sure</p> <p>97. How likely is it that you will complete a post high school program such as a vocational training program, military service, community college, or 4-year college?</p> <p>A. Definitely will not
B. Probably will not
C. Probably will
D. Definitely will
E. Not sure</p> <p>98. How many tattoos do you have?</p> <p>A. 0 tattoos
B. 1 tattoo
C. 2 tattoos
D. 3 or more tattoos</p> <p>99. How many of these tattoos were done outside of a licensed tattoo shop?</p> <p>A. I do not have any tattoos
B. 0 tattoos
C. 1 tattoo
D. 2 tattoos
E. 3 or more tattoos
F. Not sure</p> <p style="text-align: center;">This is the end of the survey.
Thank you very much for your help.</p> |
|--|--|

Appendix C

Alternative Model for LGB youth



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